ARCHIVES OF OTOLOGY.

REPORT ON 806 CASES OF EAR DISEASE TREATED IN PRIVATE PRACTICE DURING THE YEARS 1880 AND 1881.

By H. KNAPP.

THE following pages contain a tabular statement with incident remarks of all the *new* ear patients that have come under my private care during the years 1880 and 1881. They are less numerous, but have the advantage of being better and longer observed than the hospital patients.[1] I do not purpose in this report to go extensively into details, but only to point out what is of somewhat rarer occurrence, and to state what mode of treatment has been adopted for the different diseases. In the methods of treatment, I fear, many will censure me for various omissions, for I have always endeavored to reach my objects with the simplest means possible, not thinking it incumbent upon me to try every new remedy as soon as its first introduction reached me. How many propositions have been made in aural therapeutics during the last decades, that had only an ephemeral existence!

I have abstained from the customary mode of tabulating the *results* of treatment, as some cases were seen only once or a few times in consultation, and too many ceased attendance before the disease was terminated to make numerical statements sufficiently reliable. The records of the cases have been carefully made by myself as long as the patients were under observation, so that in preparing this report, I

[1] The number of ear patients treated during the same period of time at the N. Y. Ophthalmic and Aural Institute by myself and the assistant surgeons, Drs. T. R. Pooley, E. Williams, R. O. Born, and R. C. Brandeis, was 2,014, that of the operations 101.

scarcely ever had to resort to my memory. The numbers represent patients, not diseases, and even if the two ears had different affections, only the most important was recorded.

CLASSIFICATION OF DISEASES AND OPERATIONS.

A.—*Outer Ear.*

1.	Eczema of auricle and ear canal	14
2.	Freezing of auricle	1
3.	Partial perichondritis	1
4.	Total perichondritis, chronic	1
5.	Diffuse inflammation of the outer ear	15
6.	Furuncles in ear canal	21
7.	Exostosis of canal	3
8.	Impacted cerumen	73
9.	Aspergillus	11
10.	Cockroach in canal	1
11.	Closure of canal	2
12.	Bilateral rudimentary auricle and closure of canal	1
13.	Myringitis traumatica	1
14.	Traumatic rupture of membrana tympani	1
		146

B.—*Middle Ear.*

15.	Acute catarrhal otitis	38
16.	Subacute catarrhal otitis	33
17.	Chronic catarrhal otitis	280
18.	Acute suppurative otitis	64
19.	Subacute suppurative otitis	15
20.	Chronic suppurative otitis	190
		620

C.—*Inner Ear.*

21.	Heredito-syphilitic deafness	6
22.	Ménière's disease	14
23.	Deafness from cerebro-spinal meningitis	5
24.	One-sided deafness from mumps	1
25.	" " epileptic attacks	1
26.	" " malaria (or cerebro-spinal meningitis)	1
27.	" " no cause	1

28.	Hardness of hearing from explosion	1
29.	Deaf-mutism with total deafness	10
	Total,	40
	Grand total,	806

D.—*Operations.*

1.	Tonsillotomy	4
2.	Wilde's incision	2
3.	Removal of polypi	11
4.	Paracentesis of drumhead	6
5.	Opening of mastoid process	2
6.	Exostosis chiselled off	1
		26

A.—*Outer Ear.*

The first thing in treating **eczema** was thorough removal of all substances, crusts and the like, that could by decomposition or otherwise irritate the skin. This was effected by warm soap baths, syringing and carefully wiping the auricle and walls of the canal. Immediately afterward the reddened parts, in acute cases, were anointed with a 1% or 2% yellow mercurial salve (Hydrarg. oxid. flav., 0.15; vaseline cold cream, 10.00 grams), and covered with absorbent cotton for the sake of protection from wind and cold; in chronic cases, especially when ulceration or excoriation was present, a 1% to 3% solution of nitrate of silver was painted over the cleansed and sore parts, which were then covered with yellow ointment and absorbent cotton. I have more minutely described the whole management of these cases in a previous paper.[1] All the cases under observation were speedily—within a few weeks—cured. Some recurred by exposure or carelessness on the part of the patients, but the strict adherence to the above rules of treatment caused the relapses more quickly to disappear than the previous attacks.

The cases of **perichondritis** were treated with incision, drainage, and compressive bandage. In this way the one entered as partial perichondritis seems to have been pre-

[1] These ARCHIVES, vol. x, p. 346.

vented from becoming general. In hospital practice I have seen this result in several instances.

Diffuse inflammation of the ear canal was either traumatic, or the consequence of irritation from foreign bodies and medicaments, or the extension of inflammation from the middle ear. In one case it resulted from cold water entering the ear during bathing. The inner half of the canal was evenly red, the *Mt* sunken; $h \frac{1}{24}$, $V \frac{20}{60}$. After inflation, the *Mt* in its normal position, $h \frac{15}{24}$, $V \frac{20}{20}$. In another case, that of a lady 60 years old, it was caused by the insertion of an earring "to draw the soreness out of an inflamed eye." The next day, when she presented herself, the whole ear was red, swollen, and moderately hard, and the canal occluded. There was no particular pain, or excoriation, or discharge.

In another case, which was brought about by a plug of cerumen, the symptom of **ear-cough**, from reflex irritation, was very marked. As often as the nozzle of the syringe touched the canal, an irresistible fit of coughing ensued. The treatment in all these cases consisted in the removal of the cause, assisted, in some, by painting the parts with a 3% solution of nitrate of silver, to cause contraction of the relaxed cutis.

Furuncles, when they were small and superficial, were left alone; when they were extended and deep, they were poulticed with the ordinary flaxseed meal in a cornucopia, or the prepared and compressed Iceland moss poultice. So soon as they became soft or pointed, they were lanced. As to the propriety of operative interference in furuncles of the ear canal, my experience has been that early incisions, *i. e.*, before pus is formed, do not accelerate the recovery and cause unnecessary pain, whereas delay or omission of the incision retards the recovery, and is apt to cause burrowing of pus under the adjacent parts with partial absorption, partial sacculation, followed by relapses. It is of importance to mature the furuncle fully, and keep the surrounding tissue free from incrustation with scales or dried secretion, in order to avoid a succession of furuncles in the neighborhood. I know of no better substance for cleansing the ear canal

than lukewarm soap water. It saponifies the fat, and removes all kinds of filth most efficiently. The ear may then for a short time be protected with absorbent cotton. This treatment, as far as my experience goes, is sufficient to cure aural furuncles speedily and prevent relapses. If future investigations should bear out Löwenberg's views that microörganisms are the primary cause of aural furuncles, antiseptics would be our chief reliance. Granulations and polypoid excrescences, which sometimes follow furuncles, are, as O. Wolf has clearly pointed out, the result of insufficient removal of the secretion, and require operative interference only in neglected cases. Cleanliness and the instillation of alcohol make them shrink and disappear rapidly.

Only three cases of **exostosis** are noted, since only those were entered under this head in which the exostosis was the principal affection. Flat and mammillary exostoses of a moderate degree are not uncommon in chronic catarrhal or purulent otitis. One of the above three patients consulted me on account of a very unpleasant feeling from the retention of water in her ears after syringing on the day previous. She had been subject to accumulations of ear wax, which could only with difficulty be syringed out, and then the ears, for a day or two, would remain filled with water. I found in the inner portions of both ear canals at the anterior, lower, and posterior walls, a ring-shaped nodular ridge of bone, occluding about half of the calibre of the canals. The water was easily wiped out with absorbent cotton put on a dentist's holder. The *Mtt* and the acuteness of hearing were normal. The bony ridges were slightly hyperæmic and the starting-points of the most pronounced **reflex ear-cough.** When I touched the exostosis with a polished metal ear-probe, for the sake of verifying the diagnosis, the patient began to cough. A momentary touch was followed by one fit of coughing only, but a prolonged contact produced prolonged coughing; on the whole the coughing began at once with the touching of the exostosis, remained uninterrupted as long as the probe was in contact with the bone, and ceased as soon as the probe was withdrawn.

In the second case, the circular exostosis apparently filled the canal completely, as the skin was in contact in the centre, yet a probe could be passed through it. The introduction of laminaria bougies dilated the canal to about 3 *mm.* in diameter. The patient heard well, and was not annoyed by her affection, which was only in one ear, and had developed imperceptibly.

The third case was that of a young man whom I had treated off and on for an obstinate otorrhœa on one side. By treatment and care the discharge would temporarily stop, but at the end of the posterior upper part of the canal there always remained a slight red prominence, in which every now and then a polypoid excrescence took its origin. Snared off, it would return; alcohol made it shrink, but did not prevent it from reappearing later. On examination with a probe, a small nipple-shaped exostosis was found in the centre of the elevation. I passed a curved grooved hook around it, but was unable to break it off. I therefore denuded it on its anterior surface, and chopped it off by means of a small chisel and a mallet. The patient soon improved. He went home, and has up to date—a year—not been heard from.

The majority of the cases of **impacted cerumen** were uncomplicated, the hearing and condition of the parts after the removal being normal. Relapses were not uncommon even in cleanly people. I make this statement on the strength of careful notes, as some authors assert that ear-wax in the majority of cases, and almost always when it collects repeatedly, is complicated with chronic inflammation of the middle ear. To know whether the accumulation of cerumen is an idiopathic affection or not, has a practical bearing, as in the former case our professional acquaintance with the patient ends with one visit; in the latter case the primary disease has to receive our attention. The removal of the wax, even of large and hard plugs, rarely requires more than a few minutes, without any preliminary soaking. I take this opportunity to express my indebtedness to Dr. O. D. Pomeroy for his modification of

Toynbee's syringe. If well made,[1] this syringe is an elegant and excellent instrument. It is capacious, goes smoothly, and the flange prevents the returning water from being spattered about. The thin and long nozzle is introduced carefully ½″ or more along the upper wall of the stretched canal, and the stream, which can be made as gentle or as powerful as desired, will soon drive the plug out through the lower unobstructed part of the meatus. On my journeys I have seen even aurists of renown who were in the habit of prescribing for every patient who presented himself with a plug of cerumen, an emollient wash to be used at home. The patient had to return in a few days to have the important operation of removal of ear-wax performed. All this is unnecessary waste of time. To prevent relapses, I advise patients to bathe their ears every now and then with lukewarm soap-water. Warm soap-suds are held in the ear for about 15 minutes, then stirred with a camel's hair brush as deep in the canal as the patient can reach; then the ear is syringed with lukewarm water, wiped dry, and for a short time protected with a little absorbent cotton.

As a slop bowl I prefer the usual black hard-rubber basin to all others. It is simple, light, and affords an immediate and easy inspection of the parts removed, an advantage which is lost by using cylindrical or conical bowls, such for instance as described by Dr. Wilson.[2]

The number of cases of **aspergillus**—11 among 806—is unusually large when compared with the very small number —2 among 2,014 cases—that were observed during the same time at the dispensary. This discrepancy can, it seems, only be explained by the fact that in dispensaries, as a rule, less careful examinations are made than in private; yet Lucae,[3] who found only three cases of aspergillus among 2,388 ear patients treated policlinically at Berlin during three years, mentions the same difference, and is of opinion that aspergillus prevails more among the wealthy than

[1] Tiemann, 67 Chatham Street; Reynders, corner 4th Avenue and 23d Street, and others.

[2] These ARCHIVES, vol. x, p. 204.

[3] "Statistische Übersicht," etc. Leipzig, Hirschfeld, 1878.

among the poor. The assistants at the clinique are perfectly familiar with the symptoms of aspergillus in the ear canal, for I have frequently shown them specimens of the affection, and admonished them to examine microscopically every collection the appearance of which deviates in the least from the common plug.

Many microscopic specimens thus prepared were examined by myself, yet only twice was aspergillus found. I need scarcely say that the diagnosis, which in the majority of cases could be guessed at from the macroscopic appearance, was never recorded before it was verified with the microscope. The numbers show that the disease is about as frequent in America as it is in Europe. In one case the mould was found in an ear affected with chronic discharge; in another a cotton-pellet which, moistened with glycerine lotion, had lain for some time at the bottom of the canal and served as an artificial drumhead, was found covered and pervaded with aspergillus nigricans. This shows that the parasite, though mostly growing on dry ground, is exceptionally also found in combination with purulent discharge. Similar cases have been reported by C. H. Burnett, and others. The treatment consisted in first filling the ear with lukewarm soap-water for a quarter of an hour, then careful syringing and wiping out with absorbent cotton, then instilling one or two parts of nitrate of silver dissolved in 100 parts of strong alcohol. This was done twice a day at the beginning, later on more rarely. A perfect cure was obtained in from two to six weeks, in all cases.

The easy recognition and management of this disease, for which we are chiefly indebted to Wreden, of Petersburg, adds a great deal to the credit of the aural specialist with the laity. As an example I may be permitted to relate the history of one of the eleven cases here under consideration.

An elderly gentleman, a prominent citizen of New York, had of late to his great annoyance become hard of hearing. His family physician attributed it to his advancing years, and treated it with internal remedies. The patient endured deafness and

tinnitus resignedly, but when an intolerable itching set in in one of his ears, he decided to consult an aurist. I found subacute aural catarrh in both ears, with whitish and black membranous deposits in the depth of the meatus in one. Syringed out and placed under the microscope the deposit showed the graceful filaments and æsthetic—*sit venia verbo*—fruit-heads of aspergillus nigricans in luxuriant development. I could not deprive myself of the satisfaction of letting him look at them himself. Then I inflated his drums by Politzer's method, which raised his hearing from $\frac{1}{60}$ to $\frac{20}{60}$. He went home no less astonished than delighted. The next day his daughter came to ask me what I had done with her father. At the dinner-table he had carried on conversation as lively as ever, had spoken with enthusiasm of his visit at my office, and remarked that there was something sublime, even divine, in the science and art of medicine. "I went to the doctor," he said, "suffering and deaf; he discovered a mould plantation in my ear. After he had rooted that out, he blew into my nostrils the breath of life, and my hearing was restored."

In one case only a **foreign body** was found in the ear. It was a cockroach, which during the night had crept into a man's ear and there, by its movements on the drumhead, had made such a distressing noise that he sent for his family physician, who killed the insect by pouring chloroform in the ear. The patient's suffering was ended at once, but the family physician would not undertake to remove the animal for fear of injuring the drumhead. It easily came out by syringing.

There were two **cases of closure** of the ear canal: the one was bony and acquired, from chronic otorrhœa; the other, membranous and congenital, is the case which I described in the present volume of these ARCHIVES (xi, p. 19) and in which the attempt at restoring the calibre of the canal was frustrated by hemophilia.

The case of bilateral bony closure of the ear canal with rudimentary development of the auricles has likewise been described in these ARCHIVES (vol. x, p. 119).

The cases of **traumatic inflammation and rupture of the drumhead** were treated by nothing else than the wearing of a protective plug of absorbent cotton. They recovered

in less than a week. When a healthy drum membrane is ruptured by some cause or other the first maxim of treatment is: "hands off." Washes of any description can only do harm, boracic acid or other powders can do no good, since the possibility of bacterial infection is only an imaginary fear. If there is blood or serum in the ear canal, it ought not to be syringed out, but wiped out with absorbent cotton. The universal experience is that wounds of a drumhead will speedily heal if left alone.

B.—*Middle Ear.*

The above classification of the diseases of the middle ear is very concise, as the sequelæ of inflammation have not been, nor do they deserve to be, recorded as special diseases. The great variety of changes in the membrana tympani, the formation of polypi, pre-auricular and post-auricular abscesses, caries, necrosis, exfoliation of bone, etc., are all consequences of inflammation of the middle ear.

As to the etiology and course of the cases of **acute aural catarrh,** there was nothing remarkable.

In one case, during the presence of marked symptoms of **secondary syphilis,** a gradual impairment of hearing occurred in the right ear, and sudden loss in the left. The patient was a lady, 43 years old; her husband a debauched man. She had suffered from catarrh for two years, but without noticeable diminution of hearing. Six months before she consulted me she had an eruption over her entire body, which, though pale, was still visible when she came to me. She had psoriasis palmaris and plantaris, lost her hair, and had pharyngitis. I found circumscribed red patches on the soft palate, the right *Mt* dull, the left reddish. *h* 0, *V* $\frac{2}{60}$; Politzer's experiment raised *h* to $\frac{1}{\infty}$ and *V* to $\frac{8}{60}$. I gave her pills of biniodide of hydrargyrum 0.02 a day; further, inunctions of mercurial ointment twice daily, and mercurial baths twice a week. Under this treatment, and Politzer's experiment three times a week, she improved gradually and steadily. She was under my care from Oct. 2 to Oct. 27, 1880; then she went to Florida. Though there was manifest inflammation of the middle ears, the sudden and high degree of hardness of hearing in the left indicated implication of the labyrinth.

If the patients came to me early, I insisted on their staying at home and in bed, until the constant acute pain and the nightly paroxysms were over. I advised them, further, to keep up a moderate perspiration, take an aperient, and put leeches before or behind the ear. Those that followed my advice, almost without an exception, made a rapid and good recovery. It was gratifying to notice how quickly the redness and bulging of the drumhead disappeared. I am satisfied that this treatment, in many cases, prevented perforation of the membrana tympani, purulent discharge, and their consequences. I consider acute otitis media, be it catarrhal or purulent, as an important disease, and know by experience how well applied are a few days of rest and faithful attendance to medical advice at the beginning of this affection. Knowing that in acute catarrhal and suppurative inflammation of the conjunctiva, the removal of the secretion and the application of cold are the controlling therapeutical agents, I think that for the analogical diseases of the drum cavity, *paracentesis* and *cold applications* must be of benefit. In spite of this and their warm recommendation by very good authorities, I have but little experience with either of these procedures. *Paracentesis* would give an outlet to the secretion, and could be supplemented by inflation and suction. Though being aware of these advantages, I have yet a natural aversion against this operation, for I dislike opening any cavity of the body and putting its interior in direct communication with the atmosphere. The tympanum is not a closed cavity indeed, yet the air which passes through the Eustachian tube is warmed, filtered, and received only at intervals. Performing the paracentesis of the drum and the cleansing of the ear under spray, and applying a protective bandage, for which a plug of absorbent or medicated cotton will suffice, is to employ a cumbersome apparatus for a very small wound. Although this may be unnecessary and the cotton or boracic acid powder a sufficient protection, I yet prefer to cure the disease, if possible, without a wound in the drumhead.

The *application of cold* to the lining membrane of a cavity

more than an inch removed from the surface, is a desideratum for which it is difficult to find the right procedure. Although I consider attempts in this direction perfectly legitimate, the superior results both of paracentesis and the application of cold have not yet been so forcibly demonstrated as to induce me to abandon the above-described simple and efficient mode of treatment.

In the cases of **subacute and chronic catarrh,** the treatment of the nasal and pharyngeal mucous membrane is of the greatest importance. In catarrhal pharyngitis I advise the patients to use alum, tannin, and chlorate of potash gargles in solutions not stronger than one or two per cent., directing them while gargling to throw their heads well back, and make, according to Tröltsch, besides the gargling some swallowing motions, or actually to swallow a small quantity of the solution. In this way the remedy comes in contact with the naso-pharyngeal mucous membrane, and some drops will even flow out through the nose when the head is bent forward. To act upon the nasal mucous membrane, I advise the patients to dip a middle-sized camel's hair brush into the astringent liquid—which I commonly give weaker than for gargling,—put the brush into the nostrils, and draw the liquid up by forcible inspiration. Thus the mucous membrane of the nasal passages is moistened in a very simple and gentle way. When the patients come to the office, I spray their nose, palate, and naso-pharynx with weak astringent solutions, for instance, sulphate of zinc 1:100, by means of a hand atomizer. I have discarded the *nasal douche* altogether, not only because every now and then a patient, despite all precautions, uses it so as to get water into his ears, causing severe otitis, but principally because I do not think it rational to deluge with any solution those cavities through which, in the physiological condition, no watery liquid ever passes. When voluminous, hardened, or tenacious collections are to be removed, I use by preference the *posterior nares syringe.* To act on the E. tube and middle ear I employ inflation by Politzer's method and the catheter, followed by injections of mild astringents into the tubes, two or commonly three

times a week. In injecting liquid through the E. catheter I am always careful to use only a very small quantity (a few drops), which must exhaust itself in the tube, and not penetrate into the tympanic cavity. If this is disregarded, and the injection is successful, the patients commonly feel sharp pain, and the *Mt* becomes red immediately afterward. Several times, when I was less on my guard, this accident has happened, and in spite of the beneficial effect of the immediate performance of Politzer's experiment, the pain would last from one half to several hours, in exceptional cases one or several days.

Adenoid granulations, on which the discussion has been so lively during the last years, were not infrequently seen in combination with subacute or chronic aural catarrh. Although I have always been in the habit of abscinding hypertrophied palatal tonsils, I have abstained from operating on those formations in the naso-pharynx. In young children I have treated them with gargles and injections of a 1% or 2% solution of nitrate of silver by means of the posterior nares syringe, carefully regulating the children's hygienic conditions. The progress was slow in all cases, yet the results, on the whole, very satisfactory. Gradually these glandular intumescences would disappear; a healthy-looking mucous membrane took their place: the children would breathe easily through the nose and keep their mouths shut at night. The injections of nitrate of silver were made 2 or 3 times a week for about 2 or 3 months in succession, then interrupted, and later begun again in the same manner, according as the season would furnish indications. I have a disinclination against all destructive methods (cauterization and operation) of dealing with these hypertrophies, for I am afraid that, with the excrescences, also the normal parts may be destroyed, and thus that most uncomfortable of all pharyngeal diseases, the so-called dry catarrh, be brought about, in which the mucous membrane is converted into cicatricial tissue. The analogon of this is the xerosis conjunctivæ, so commonly observed after trachoma. Partial cicatrization, which the earlier oculists termed *xerosis glabra*, is very often seen at the posterior pharyngeal wall of pa-

tients suffering from subacute or chronic aural catarrh. The surface represents a mesh work of shining white scars, in the islets of which prominent patches of mucous membrane are preserved. This process, extending into the E. tubes, will most efficiently narrow and even obliterate their calibre. How should we treat this condition, and, what is of still greater importance, how should we treat its preliminary stage, the follicular catarrh? Experienced laryngologists tell me that there is a certain number of cases in which cicatrization will be the unavoidable termination, whatever mode of treatment be instituted. The same opinion is held by many oculists concerning the issue of the trachomatous process. For a certain number of cases I am willing to subscribe to it, but for their great majority I feel convinced that a cure can be effected with preservation of the mucous membrane. The principle of treatment, emphasized by Von Gaerfe and now almost universally adopted, is to use remedies sufficiently irritant to cause hyperæmia and absorption, but not to destroy the trachoma granule. Guided by the good results obtained from this maxim in ophthalmic practice, I have preferred the slow and sparing to the rapid and possibly destructive way. When the adenoid vegetations and the obstructions of the nose were so developed as to require surgical interference, I have sent the patients to laryngologists more experienced in managing them than I am. The discussions on this subject, the criticisms by Hartmann[1] and others, and the remarks in Dr. Schalle's last paper,[2] are sufficient proof of the difficulty, if not of the uncertainty, still prevailing in the different modes of treating these proliferations.

Many of the 280 patients affected with **chronic aural catarrh,** were only examined, not treated. It is of importance to ascertain the conditions on account of which treatment has to be pronounced useless. If (1st) the patients were advanced in life, (2d) the hearing power not or only little subject to variations, (3d) the naso-pharynx and middle ear free from changes indicating still persisting inflam-

[1] *Deutsche med. Woch.*, No. 9, 1881.

[2] These ARCH., vol. xi, p. 132, etc.

mation; if, moreover, (4th) inflation both by the air bag and catheter had no influence on the hearing, I did not undertake to treat the patients, but gave them a candid statement of their condition with such rules as appeared most conducive to retain what hearing power there was left. A sunken and perfectly pale drumhead, with a pervious E. tube, and no increase of hearing by inflation, is not sufficient to abstain from treatment, as long as a more or less inflammatory condition of the nose, pharynx, and tubes is present, the cure of which will at least greatly contribute to render the hardness of hearing stationary, and in not a few cases will supprise us by a considerable and lasting improvement of hearing. Among the cases there were a few only of sufficient interest to be specially reported.

One of the patients heard a marked buzzing noise only when higher tones were sounded. With the tones of a piano it was not noticed, but quite well when high tones were sung, and very distinctly when a König's rod of 12,000 vibrations was struck. He had old cicatricial pharyngitis, sunken drumheads, and pervious tubes. Another case, however, may be related, as it furnishes an example in what way preposterous damage-suits are instituted and won in the city of New York.

On Feb. 2, 1880, a lawyer of my acquaintance came to me with a man of 39 years of age, a native of Bavaria, for whom he wanted to obtain $5,000 from the Elevated R. R. Company for damaged hearing by an accident. Patient related that July 3d, 1879, a piece of iron 1″ thick and 3″ or 4″ long fell on his stiff felt hat while he was passing under the elevated railway. With a bleeding head he was taken to Chambers Street Hospital, dressed, and sent home. He had pain in the head and felt dizzy, but did not stagger. Four weeks after the accident, when the wound had healed, he began to have noises and became hard of hearing, which has gradually been worse. For the last four months his memory has been weak. An ulcer formed on the side of the nose, extended, and was followed by ulcers on the right side of his head. When the lawyer presented him to me these ulcers were still present, but covered with scabs and filth. The left ala nasi and adjacent part of the cheek and upper lip were swollen, dark red-

nodular, and ulcerated. On the left side of the head a scar in the scalp $\frac{3}{4}''$ in extent, not connected with the bone. Some glands in nape of neck swollen. The soft palate and the centre of the hard palate occupied by extensive white and stellate scars. Ulcers and swelling of cricoid cartilages; vocal cords red. Patient has been hoarse for four weeks. Pharynx and mouth of E. tubes congested and swollen. Phimosis; scars on prepuce. Right *Mt* evenly dull, whitish, reflex small, relief normal; left *Mt* sunken, white at periphery, reflex only a dull point. L *h* $\frac{1}{\infty}$, bone-conduction uncertain; R *h* $\frac{1}{24}$, bone-conduction good. *V* R $\frac{20}{60}$, L $\frac{5}{60}$. Tuning-fork from forehead heard on right side only. When the right ear is held closed, he pretends to hear no longer, or only very faintly, the tuning-fork vibrating on his forehead, whereas, when that ear is left open, he says he hears the tuning-fork well. Inflation by Politzer's method unsuccessful; by means of the catheter, difficult. No improvement of hearing.

Though the patient denies ever having had a chancre, the symptoms of constitutional syphilis are quite pronounced. Certain it was, that the piece of iron which fell on his head had nothing to do with the impairment of his hearing. He had marked chronic aural catarrh, caused or aggravated by constitutional syphilis. Moreover, he was a malingerer, for he was at once caught by Moos' test for detecting simulated one-sided deafness, which is as follows: when a person pretends to be deaf in one ear, and hears the tuning-fork from the glabella well in the other when left open, but no longer when it is held closed, he is sure to simulate.

I communicated the result of my examination to the lawyer, adding that my testimony, if the case came before the jury, could only be prejudicial to his client. Whether the case was tried or settled by compromise I do not know, but some months later, when I met the lawyer again, he told me, with the happy expression of a man who has accomplished a good action: "I got $2,000 for the poor fellow."

The sixty-four cases of **acute suppurative otitis** repeated in general the conditions which I described in detail, in a previous paper, based on 183 such cases.[1]

[1] These ARCHIVES, vol. viii, p. 1, etc.

Some may be specially mentioned.

A lady of 33 years of age had *pneumonia*, followed by earache and perforation of *Mt.* Three weeks later intense headache set in, lasted five days, and was promptly relieved by Wilde's incision. Recovery.

A healthy infant had *ophthalmia neonati* and *otorrhœa* at the same time. The eye disease was permanently cured and without sequels, in five weeks, by cold applications and careful removal of the secretion. The otorrhœa ceased at the same time, but relapsed sixteen months later, and was cured in a few weeks.

A young lady in the habit of using the *nasal douche* for nasal catarrh, had singing noise, but no direct pain whenever she used the douche. Had no ear trouble before. One application was followed on the right side by earache immediately, and discharge the next day. I found the *Mt* of the other ear intensely red and its posterior part bulging. I perforated it two days later. Recovery of both ears in six weeks, with perfect hearing and normal condition of *Mt.*

A man, 44 years of age, had suffered for ten months from cough and coryza with loss of smell, for which he had used the *nasal douche.* A week before he came to me while using it again, and having the water warm with some salt in it, he felt in both ears a sudden pain, which, in the night, became violent, and was followed by discharge. Remission during the days, but exacerbations with deliria during the nights. Hearing lost from the beginning. I found both *Mtt* perforated, the mucous membrane of the drum cavities red and swollen ; tick of the watch heard neither from ear nor skull. The tuning-fork was heard through air and bone, its sound not intensified by closing the meatus ; voice only at a distance of 3″ on each side. After Politzer's inflation, the tick of the watch heard on contact everywhere ; voice R $\frac{12}{60}$; L $\frac{8}{60}$; both together $\frac{18}{60}$. Treatment : leeches, rest in bed, cleansing with absorbent cotton, introduction of impalpable boracic acid powder, and inflation by Politzer's method. Relief immediate, discharge rapidly diminishing ; on the 11th day after his first visit, both *Mtt* entire ; on the 15th cleansing themselves, but still red and without reflex. *V* $\frac{3}{60}$, by Politzer $\frac{30}{60}$. Politzer continued for two weeks longer. Recovery perfect.

A man of 30 years contracted, in the Catskill Mountains, June, 1880, a violent nasal catarrh, for which he *snuffed up cold alum water.* Six hours later intense pain in both ears and in the left

occipital region. The pain was moderate during the day, but violent at night, depriving him of sleep. Ten days after the onset he came to me. I found the right *Mt* slightly, the left intensely, red and bulging in its anterior and posterior portions, so that the handle could not be made out. The watch heard on left side neither on application to the ear nor to any part of the skull; when applied to the forehead and teeth, it was well heard in the right ear, not at all in the left. Patient refuses to have paracentesis made. Politzer's inflation successful with a snap. Watch immediately afterward well heard on left ear and mastoid. The inflation relieved him until that evening; the night he had pain again; free the next day, suffering greatly the night. The day after this I found the posterior part of the *Mt* bulging like a bladder, the size of a split pea. Paracentesis at that place. The needle was moist with pus, and Politzer's method drove out several drops of creamy pus. Relief for several days, then violent earache again; tenderness and puffiness of mastoid region. These symptoms increased for a few days; the pain was intense and radiated to the top of the head. The creamy discharge which had been considerable during the first days after the paracentesis had stopped. On the sixth day I found the opening closed and the *Mt* bulging again. I therefore repeated the paracentesis, this time not contenting myself with a puncture, but made a *long incision.* Pus was liberated and relief afforded at once. Recovery in four weeks.

In three cases the disease was brought on by *scarlet fever complicated with diphtheria.* Two of them are not without interest. In one, a very severe case, the diphtheria laryngis et faucium was complicated with diphtheria of one eye, which had a large corneal ulcer with infiltration of the whole cornea when the patient came under my charge. The eye was destroyed. Both ears had acute suppurative inflammation without diphtheritic patches. One ear recovered, the other had a large destruction of the *Mt*, with formation of polypi. These were removed and the discharge cured, but the hole in the *Mt* was not closed when patient was last seen, about six months later.

The other case was that of a boy of 3 years who, in the second week of scarlet fever, had discharge from both ears and *complete deafness.* When I was called in consultation I found a large perforation of the *Mt* and great swelling of the tympanic mucous membrane on both sides. Neither before nor after Politzer's experiment was there any sign of perception of sound. The boy was con-

scious, directed his eyes to every new object that was brought before him, but reacted on no sound, not even on that of a large tuning-fork passed, vibrating, from behind up and down his ears. This condition lasted about a week. I could give the parents only the consolation that such cases would not infrequently occur in the course of scarlet fever, but that only exceptionally the hearing remained permanently abolished. Under judicious general treatment, the application of astringents to his naso-pharynx, careful cleansing, and the use of boracic acid in the ears, the hearing gradually returned ; in one ear there was *restitutio ad integrum ;* in the other the *Mt* remained perforated for months, polypoid excrescences developed and were removed ; the discharge and swelling of the mucous membrane disappeared, but there were occasional relapses.

In another case *diphtheria* of the throat was complicated with purulent otitis on both sides without specific manifestations of diphtheria in the ears. Both ears were cured.

The *bad effect which syringing* has in some cases, is illustrated by the following example.

A boy of 10 years had coryza the whole winter of 1880 to 1881 ; earache two months before he came to me, was better, but worse the last week ; $h \frac{6}{24}$, $V \frac{20}{60}$ each ear. Left *Mt* pale, right bulging, red ; walls of adjacent part of canal red and swollen ; pharyngitis. Ordered leeches and alum gargle, and used Politzer. Improved for a week, but then perforation of *Mt* and discharge. Relief. A week later, when the walls of the canal were less swollen, he syringed the ear with lukewarm water to which a little salt was added. It caused intense pain for hours. The next day he syringed it again, and suffered violent pain from it immediately afterward and the whole night. When he came to see me the following morning, I found him pale, his right mastoid tender and swollen, a large perforation of the *Mt*, and great swelling of the tympanic mucous membrane. I gave him quinine 0.60 *pro die*, advised him to keep his bed, not to syringe the ear any more, but dry the secretion up with absorbent cotton. He improved at once, the hole in the *Mt* closed in two weeks, and he recovered perfect hearing.

This is not the only case in which I have seen syringing do harm, and no doubt on the strength of similar observa-

tion some aurists have advanced the opinion to discard syringing altogether, replacing it by wiping with absorbent cotton. This would be going to the other extreme, and deprive us of one of the most valuable procedures. The indications for syringing may be stated as follows. In recent and uncomplicated perforations of the drumhead, of which the traumatic rupture is the prototype, no liquid—in general no substance of any kind, air inclusive—should be introduced into the tympanic cavity. In acute perforative otitis the secretion should be wiped out with absorbent cotton. If the discharge continues for several days, is copious, and the wiping insufficient or painful, syringing with lukewarm salt or boracic acid water should be tried, and the repetition made dependent upon the absence of reaction. In chronic suppuration, syringing is indispensable, so much so that the ordinary syringe in some cases must be supplemented by one with a thin nozzle curved at its end, which is introduced into the tympanic cavity,—also into the mastoid cavity when it is opened,—turned in different directions so that the stream, regulated in its intensity by the irritability of the parts, washes out the recesses of the cavity. Numerous such tympanic syringes have been described. The one which I use has a very thin nozzle fitting on an Anel's lachrymal syringe, and is bent at both ends, so that it can be introduced and employed under the guidance of a forehead mirror. Only in this way secluded masses of inspissated pus and decomposed debris of tissue, upon which the action of antiseptics is no more than skin deep, can be dislodged.

In some cases the inflammation extended to the periosteum of the canal and mastoid process, which condition, in children, is quite common, and forms the well-known post-aural abscess, of late so well described in its features by Bezold.[1] A prompt recovery commonly follows the evacuation of the pus by an incision behind the ear. One case, where the patient refused operative interference, and perfect spontaneous recovery took place, may be reported.

[1] *Arch. f. Ohrenh.*

A young man, 17 years of age, had a cold and earache a week, then discharge, $h \frac{1}{\infty}$; $V \frac{1}{60}$. Syringing, nitrate of silver, $\frac{1}{8}$ %, instilled twice daily. Three weeks later proud flesh as large as a split pea protruded through the hole in the *Mt.* Ear cleansed with absorbent cotton. The discharge stopped, but the walls of the ear canal, the post-aural region, and the upper half of the sterno-mastoid muscle were swollen and tender to the touch. He had headache and nausea, the pain was at the top of the head, not at the side.

It was evident from the symptoms that the inflammation had extended to the periosteum of the adjacent parts.

I advised a deep incision, but the patient refused it. He preferred having it treated as an internal disease, would lie in bed, steam his ear, put warm water in it, take quinine and hot tea to provoke perspiration. The inflammation at once subsided. The discharge returned, but remained moderate, ceased altogether in a week; the swelling in the ear canal and the sterno-mastoid muscle soon disappeared. At his last visit, 32 days after the onset of the grave symptoms, the recovery was perfect, his *Mt* restored, and $v \frac{20}{20}$.

Another case, that of an engineer of 30 yrs. of age, was remarkable by the *acuteness and severity of the symptoms.* It is reported in detail in the "Transactions of the American Otological Society" of 1880. I shall therefore only briefly mention it here. By exposure a sudden attack of tinnitus, earache, pain in mastoid region of the right side, dizziness, tendency to fall forward and to his right side, speech slow, the whole right side of head heavy and very painful by spells; a week later, when he presented himself, the same subjective symptoms. Right *Mt* white, dull, bulging in posterior part. *Paracentesis* and Politzer liberate a considerable quantity of sero-purulent substance. The symptoms from the ear abated, but the mastoid region remained tender, and there was violent pain radiating thence over the whole corresponding half of the head, with nightly exacerbations. The patient went to the hospital, but as rest and careful treatment did not diminish the headache, I *trephined the mastoid* and let out a moderate quantity of thin pus. His pain subsided at once, and did not return. In two weeks the discharge stopped, in four weeks the perforation of the drumhead closed, and in six weeks (after the trephining) the recovery was perfect, with $v \frac{20}{20}$. No relapse.

The 15 cases of **subacute suppurative otitis** referred to patients who, in the course of chronic otitis media, either catarrhal or suppurative, had acute attacks of suppuration. These attacks were treated as primary suppurations, until the previous condition of comparative freedom from inflammation was reëstablished. One was quite remarkable for the intensity of cerebral symptoms:—violent headache, nausea, dizziness, staggering gait, no sleep at night. The objective symptoms were only in the tympanic cavity and osseous canal; the mastoid was neither tender nor swollen. I enlarged the opening in the *Mt*, had the ear steamed, cleansed with absorbent cotton, as syringing increased the dizziness even when it was done gently and with the head bent toward the syringe. There was no optic neuritis—which, on the whole, seems to be a rare complication of otitis, yet I have seen unmistakable examples of it,—and the patient without an operation recovered from the acute attack in six weeks. It required six weeks more to stop the discharge and render him fit for his business.

In another case, that of a young man of 16 years of age, the relapses of otorrhœa, which had occurred repeatedly every year, were at once and permanently cured by bilateral tonsillotomy, furnishing another example, if any were still needed, of the usefulness of this comparatively simple operation. Another case showed the same favorable result after the destruction of adenoid proliferations in the nasopharynx.

The last group of middle-ear diseases, the **chronic suppuration,** was represented by 190 cases. Not only this great number, almost 25 % of the whole, but also the variety and importance of morbid conditions shown by and resulting from this group will easily explain why otitis suppurativa chronica requires more of the aurist's labor and time than any other group, perhaps almost as much as all other groups of ear disease together. His active interference is called for, from the simple act of efficient cleansing to operations which even in the most expert hands have shown a mortality of over 10 %. The first step in the treatment of chronic purulent otitis is *thorough cleansing.*

If the discharge be not copious, the cleansing may be begun with wiping it out with absorbent cotton, which will demonstrate its character and odor. Syringing, however, is mostly indispensable, as the cotton will not penetrate into recesses and fissures as well as water does. On the other hand it is necessary mechanically to remove collections of dry scales, inspissated pus, or ropy tenacious mucus, over which the water will pass without dislodging them. The performance of cleansing an ear should never be considered as being below the dignity of a well-established physician; it requires time, efficiency, and delicacy, to which the patient is entitled, and I do not hesitate to say that regular and thorough cleansing in chronic suppurative otitis is half the cure.

Next comes the application of remedies:—antiseptics, disinfectants, astringents, caustics. An invaluable remedy is good absorbent cotton. After the thorough cleansing a plug or wick of absorbent cotton will protect the diseased mucous membrane from the action of the atmosphere, and convert the open sore or wound quasi into a subcutaneous one. The atmospheric air is never pure, but more or less impregnated with inorganic and organic, dead or living particles. Without being ardent bacteriologists we can easily understand that after a perforation of the membrana tympani the exposed drum cavity would be injuriously influenced by the air. On the one hand the soft tissue would exsiccate by evaporation, or on the other it would inflame by the contact of extraneous particles. Absorbent cotton could protect it from the latter, while the exsiccation might be prevented by an impenetrable plug. This, however, is unnecessary, for the exsiccating effect of the atmosphere is more than counterbalanced by the moist secretion resulting from the inflammation. The secretion, as far as it does not organize, must decay and irritate the living tissue. To remove the surplus of secretion, *i. e.*, that part which is not required for keeping the mucous membrane moist and in proper chemical composition, and to prevent it from assuming irritant qualities before it can be removed, form the main object of dressing wounds or open surfaces in general.

We have to see how these objects can best be attained in the particular case under consideration, when the destruction of the membrana tympani has converted the middle ear into an open surface. The insufflation of impalpable boracic acid powder seems to answer that purpose better than any thing else. My own experience is quite in accord with the favorable opinion which this remedy, introduced by Bezold into aural practice, has generally received. Based on these principles the treatment of *uncomplicated* cases of chronic otorrhœa would consist in:

1. Careful attention to the condition of the nasal passages, palate, pharynx, and Eustachian tubes.
2. Inflation by the air-bag and the catheter.
3. Thorough cleansing of the tympanic cavity.
4. Insufflation of impalpable boracic acid powder into the ear.
5. Introduction of a wick of absorbent cotton.

These procedures have to be repeated once, twice, or three times daily, according to the small or large amount of the secretion. In general, the dressing has to be renewed as soon as the powder becomes moist. In this way the cases of protracted otorrhœa from scarlet fever, sea bathing, etc., were cured; those with a constitutional disease, scrofula, tuberculosis, etc., were also benefited, though other local remedies had commonly to be substituted from time to time. Before boracic acid was introduced into aural practice I commonly used, and still use, solutions of astringents in alcohol and water, according to Löwenberg. Nitrate of silver or sulpho-carbolate of zinc, 1 or 2 parts to 50 parts of alcohol and 50 parts of water, was the common strength. If the mucous membrane of the drum cavity was swollen, or granulation tissue developing, the part of alcohol was increased over that of water, not infrequently to using alcohol alone, according to Weber-Liel. I have found alcohol very efficient in reducing swollen mucous membrane, and may add here that I can fully concur with Politzer, who recommends it so highly for making polypi disappear by gradual shrinkage. Lately I have followed Löwenberg's advice in mixing finely powdered boracic acid with alcohol

and water, taking 10 grms. of boracic acid to 30 grms. of alcohol and 30 grms. of water. Before use the solution has to be shaken. Löwenberg states that in this way the boracic acid comes in contact with the whole expanse of the tympanic mucous membrane, whereas when used in the form of a powder, it would not reach the many recesses of the drum. My experience confirms Löwenberg's opinion of the good effect produced by the above combination.

Of the specifically so-called antiseptics and disinfectants I have used carbolic acid, hypermanganate of potash, resorcin, and boracic acid in watery solutions, but have not found them better than the ordinary astringents.

If there was granulation tissue in the drum, and symptoms of retention of pus, the granulation tissue was scraped out with a sharp spoon, and the return of the discharge favored by warm water baths and steaming. In several cases treated in this way, opening of the mastoid, which seemed indicated, could be avoided.

The hardened, scaly collections in desquamative otitis were first softened and loosened by pressing a plug of absorbent cotton, soaked with glycerine, deep into the ear canal. The plug was left in position a few days, then removed, and the collections syringed or wiped out. To thoroughly remove them commonly required several repetitions of this procedure.

When despite the above treatment the granulations returned persistently, especially when the discharge continued offensive, I not only removed the granulations, but scraped also the underlying bone, according to O. Wolf, in order to remove small particles of necrosed bone.

I have never been partial to the application of strong remedies, for instance, solutions of nitrate of silver stronger than 2 %, of chromic or nitric acids, or the like; neither have I used the much-praised galvano-cautery in the ear.

This leads me to speak of the management of **aural polypi,** of which, in the course of years, a considerable number have come under my care. The principle of my treatment has been to let them grow until they became pedunculated, then seize them at the pedicle, and draw them out with

Hinton's polypus forceps. Only when they were small, succulent, and projected well into the canal, I snared them off. For years past I have never touched a polypus with caustics of any kind, since by doing so the growth of this neoplasm is only accelerated. Not even the roots of polypi, as a rule, were touched with caustic. This mode of treating aural polypi I derived from my observations of conjunctival polypi, which in former years came to my notice quite frequently. When, in strabotomy, the tendon is not cut close to its insertion into the sclerotic and the wound is not closed by conjunctival sutures, it is not uncommon to see proud flesh sprout from it, which gradually develops into granulation tumors of considerable size. If touched with nitrate of silver, as I have seen in older surgical clinics, the growth may assume a fungoid character, cover the cornea and protrude beyond the palpebral fissure. I know that an eye was removed after having been persistently treated, or rather maltreated, with caustics, because the "granulation growth had been convered into soft cancer." This was 20 years ago. If the conjunctival polypi are left alone for one or two months, only care being taken that the conjunctival sac be kept clean, their basis contracts into a small pedicle, which ultimately tears. Thus the polypus is cast off, and the disease cured, for the root of the pedicle shrinks away. We need not, however, wait for this spontaneous elimination of polypi, but snip them off as soon as they become pedunculated. The root will disappear by itself.

As to **aural polypi,** I think that everybody must have made the experience that large polypi are easier to deal with than small ones. They can readily be seized with forceps or snares and drawn out, the snare mostly being only a modification of the forceps, both acting by traction. There is a much greater chance radically to extirpate the polypus in this manner than by cutting it off with the cold or hot wire of the one or other kind of écraseur.

The plan of treatment, therefore, is as follows: If a polypus presents itself in such a form as to be easily seized with forceps or snare, it is at once removed in order to save time. If, however, it has a broad base, or if there

are several, and the removal is difficult, or if there are remnants left after an operation, the growths are subjected to the alcohol treatment, but not cauterized in any way. The effect of the treatment is carefully watched, and especial attention paid to the avoidance of retention of pus. The syringing is done very thoroughly, and the curved nozzle of the tympanic syringe may be used with advantage.

As far as my present experience goes, the alcohol is apt to lose its effect in from four to eight weeks. If, then, the polypi are not shrunken, and begin to increase again, their growth need not be interfered with, as long as there is no danger and the patient experiences no particular discomfort, until they have become pedunculated and can be removed entire. During this period of growth careful cleansing and the use of mild washes, such as solutions of boracic acid, permanganate of potash, resorcin, chloride of sodium, and the like, may be used, so that when the polypi are removed the alcohol has a good effect again on the roots and the swollen mucous membrane of the drum cavity. To resume:

1. Begin with removing the polypi if it can be easily done.

2. If not, try the alcohol and nitrate of silver treatment to make them shrink.

3. If they resist, let them grow until they become pedunculated, but take care that no retention of pus ensue; cleanse thoroughly, and use mild washes.

4. Remove the polypi with the forceps or snare when they can be well grasped and extracted or snared off as a whole.

5. Use as after-treatment alcohol either pure or in addition to nitrate of silver, 1 % or 2 %, or impalpable boracic acid powder, 10 % to 20 %.

This definite plan of treatment has given me much more satisfaction than the constant nagging at the excrescences, here destroying a little fragment, there stimulating another, thus keeping the parts of the drum cavity and its vicinity in a state of constant irritation, until at last strong cauterization is resorted to, and not only the polypi, but also

the surrounding parts, are destroyed to a greater or less extent.

In returning to the old procedure of avulsion of polypi, I am well aware how severely it has been criticized. The greatest objection raised against it is, that portions of the *Mt* or of the ossicles may be drawn out together with the polypi. No doubt this has happened, and a number of such cases are on record. I have not met with such an accident in my own practice, probably from the reason that I did not introduce the forceps as deep as it could reach, and seizing all the tissues it could grasp, but because I waited until the polypus was pedunculated, and afforded a firm hold either at its pedicle or body, to extract it without endangering any integral parts of the hearing organ. The beauty of this plan is the completeness of the operation, the simplicity of the after-treatment, the rapidity of the recovery, and a great freedom from relapses.

Sclerosis of the mucous membrane of the drum cavity was chiefly treated with Yearsley's cotton pellet. Thickening of the *Mt*, with a clean, permanent perforation, was treated in the same way, or with Blake's paper discs. As I have but recently published the results of my endeavors in this direction,[1] I must not dwell on that subject in this place. In the present series six cases are noted in which the pellet had a permanently good effect.

Of the greatest importance were those cases in which the **inflammation extended beyond the tympanic cavity,** of which the following examples may be mentioned.

Polypus, caused by necrosis in the osseous part of the ear canal.— A young lady, æt. 17, had suffered from otorrhœa and hardness of hearing since her eighth year, after scarlet fever. When she presented herself on 5th Oct., 1881, there was a most offensive discharge from both ears, tinnitus, and considerable pain in ears and surroundings, as well as headache; *h* R $\frac{15}{24}$, L $\frac{1}{24}$; *V* R $\frac{8}{60}$, L $\frac{10}{60}$. In the right ear the mucous membrane was greatly swollen. By treatment it was reduced, the discharge stopped, and the hearing raised to *V* $\frac{20}{60}$. In the left, polypoid excrescences which filled

[1] These ARCHIVES, vol. xi, p. 60, etc., and "Transactions of the Seventh Internat. Med. Congress," London, vol. xii, p. 380, etc.

the inner part of the canal, shrank completely under alcohol and boracic acid treatment; the hammer lay bare, and was immovably united to the pale promontory. A large perforation of *Mt.* From the posterior wall of the inner end of the osseous canal an uneven, porous, dirty-gray, more or less dry bony mass projected into the canal, about the size of a split cherry-stone. It became slightly movable shortly before the patient left New York, 17th May, 1882, grated and partially broke under the efforts of extraction with the grooved hook, but was still too firmly attached to force its extraction. The patient, for the last month, had had no inconvenience, and was satisfied with the hearing she had acquired in her right ear. The hearing in the left remained $V\frac{1}{60}$, not improved by cotton pellets. She went home, to Chicago, with the advice to have her ears examined from time to time, and the sequestrum extracted from the left when it shall have become loose.

During her treatment in New York she stayed with her relatives. I showed her how to cleanse and treat her ears, so that during eight and a half months she made no more than a dozen visits at my office, and yet the progress of the recovery was as rapid and undisturbed as could be expected. I mention this to illustrate that officious nursing is none of a physician's business.

There was a certain number of cases in which *internal and external periostitis of the mastoid*, with more or less severe general (chills, jaundice, fever) and cerebral (headache, nausea, dizziness, vomiting) symptoms occurred, from which the patients recovered, without an operation, by rest in bed, perspiration, warm ear douches, steaming, cleansing the canal from obstructions, and the internal use of quinine 0.60 *pro die*.

Two patients *died*. I saw both in consultation only when the fatal termination was imminent.

The one was a boy of 10 years, who had long suffered from chronic purulent otitis on both sides. When I saw him, March, 1880, he had had convulsions and ptosis for the last twenty-four hours; he had neuro-retinitis on both sides, groaned, was difficult to rouse, and very fretful. He had profuse otorrhœa, and the canals were filled with polypoid granulations, which were at once drawn and scraped out. Death two days later. No autopsy.

The other was a young man of 22 years of age, who had had otorrhœa from infancy. Ten days previous to my visit he had an attack of fever, headache, vomiting, jaundice; the discharge from the ear had suddenly stopped. This condition persisted; pulse 100, temp. 99°; no neuro-retinitis, great prostration. Polypi and proud flesh in right ear, after the removal of which the promontory felt rough, and a small piece of dead bone was scraped off. Death six days later. No autopsy.

In both cases the mastoid was not implicated; in the latter, caries and necrosis of the petrous bone could be diagnosticated with certainty; in the other the propagation of the disease may have taken place through the tegmen tympani.

C.—*Inner Ear.*

With regard to the cases of impairment of hearing from **hereditary syphilitic taint,** I may refer to a former paper.[1] One of the cases there related, the child of well-to-do parents, who recovered her hearing by careful nursing and treatment, had a relapse a year later, but recovered from it in three weeks. I have since watched the occurrence of impairment of hearing in connection with parenchymatous (heredito-syphilitic) keratitis, and have found that it is infrequent. Even low degrees of hardness of hearing, of which two sisters were examples, are rare.

The one was 14 years old; had had, when she presented herself, interstitial keratitis for 5 months in the right, and for 4 weeks in the left eye. She complained of tinnitus aurium; *h* was R $\frac{3}{24}$, L $\frac{6}{24}$, which for the right was below the average in a child of 14 years. The pharynx was injected, the *Mtt* pinkish. Hearing distance for voice normal.

Her sister was six years old. She had had pain in her ears 6 months, the whole winter, especially when blowing her nose. *Mt* R pinkish, sunken; L a little paler than normal. Pharynx slightly injected; *h* $\frac{1}{24}$ in each ear, *v* $\frac{20}{20}$. The parenchymatous keratitis began three weeks before she presented herself, in both eyes at the same time. Both sisters had typically notched teeth. They were seen in consultation. No record of their further history.

[1] These ARCHIVES, vol. ix, p. 146.

Another case was that of a servant girl, 17 years, who in the 8th week of interstitial keratitis had a sudden earache on the left side, lasting the whole night, connected with tinnitus, dizziness, and a constant tendency to fall. The next morning I found *h* $\frac{18}{24}$, *Mtt* dull, reflex diminished in size, at periphery of *Mt* some red dots and fine vessels. Two weeks later she had another attack of earache which lasted a week. It began suddenly with almost total deafness. Tinnitus less marked, no dizziness. The hearing gradually improved, and when she presented herself to me at the end of the week I found *h* $\frac{12}{24}$, upper folds and handle red, simple pharyngitis, tubes pervious. No further notes.

It is evident that in these cases the symptoms of disease of the inner ear are coupled with symptoms of inflammation of the middle ear:—congestion, catarrhal swelling, earache. From the observation of other cases I may here state that the *milder* forms of ear disease—those where there is not a very high degree of deafness—from hereditary syphilis, commonly recover their hearing unimpaired or but little impaired.

One of the cases was that of a young man of 19 years; 4 years previous to his coming under observation he had parenchymatous keratitis, the typical picture of the heredito-syphilitic form, which lasted 7 months, and his cornea still showed the marks. His teeth are normal. The patient dates the beginning of his ear disease to sleeping in a cold, insufficiently covered roof when he was employed as barkeeper in a Western town. Confesses to have had a chancre at that time, but on inquiry no secondary symptoms could be discovered to have followed it. He had had dizzy spells and tinnitus for a whole year, his hearing gradually became worse and worse, and some months before he returned and was brought to my office, he had been totally deaf. I found him a strong-built, healthy-looking young man, whose deafness on both sides was absolute. No sound was heard through air or bone. Catarrhal pharyngitis; tubes pervious. R *Mt* dull, but relief normal; L dull, and somewhat sunken. Adjacent parts of canal narrowed by moderate swelling of bony walls.

I put him under strict mercurial treatment: subcutaneous injections of sublimate, inunctions, mercurial baths, etc. In order to avoid all outward disturbances he took a private room in the

hospital, where he stayed over three months, faithfully carrying out all ordinations. When the mercurial treatment had had a full action and there was no improvement in six weeks, he took iodide of potassium in increasing doses up to 12 grams daily. This was of no benefit either. Then he took Hg and KI combined. His pharyngitis and the slight dulness of the drumheads disappeared, but he remained completely deaf and was discharged as incurable.

Among the 14 cases of **Ménière's disease** there were several in which this well-known complex of symptoms occurred in the course of chronic catarrhal or purulent otitis; in others it was of traumatic origin; in others, again, it was meningitic or apoplectiform. I will specially mention only those cases which are somewhat remarkable.

A gentleman of 48 years became suddenly deaf in his right ear; dizziness, no vomiting, but staggering, inclination to turn to the left; lasted six weeks. Different kinds of noises have remained permanent; swelling of feet and face; a nettle rash on skin; lost his hair. *Mtt* n. H o in R, good in L. Sight and interior of eyes normal.

The history of this case is from notes taken by Dr. R. O. Born, who examined the patient during my absence, Aug., 1881. The lesion probably was a hemorrhage or serous effusion into the right labyrinth of a syphilitic man. He writes me that his deafness remained the same.

In a case of one-sided catarrhal deafness in a man of 36 years, attacks of headache, nausea, vomiting, vertigo, staggering, etc., had been quite frequent during the last 14 months, when his physician brought him to me for consultation. His physician sprayed his pharynx, blew iodoform into his pharynx and tubes, and made him take Déclas' syrop iodophénic. The attacks of aural vertigo disappeared, the deafness remained.

In the following case of a cerebral disease the impairment of hearing was combined with impairment of sight, which led to permanent blindness, whereas the hearing was restored.

A child of 7 years was brought to me Jan. 5, 1880, after an attack of headache, nausea, vomiting, and staggering, which began

at 2 A.M. and lasted until 11 A.M. A year previously she had had a similar attack, with delirium, lasting four days. No convulsions, but numbness of fingers at the beginning of each attack. *St. pr.*: R. pupil large, immovable; L sluggish; for the last three weeks gradual diminution of hearing, tinnitus like a drum, dizziness, and tendency to fall toward her left side. R *V* $\frac{1}{60}$; L $\frac{6}{60}$; *Mtt* fairly normal. Neuro-retinitis with stellate figure at yellow spot in both eyes. She took calomel, $\frac{1}{2}$ cgrm., three times daily; later iodide of potassium with it. Her headache and hearing gradually improved. After six weeks' treatment her hearing for two weeks was quite well, then became worse again. It was then $\frac{8}{60}$. In two months and a half the optic discs were atrophic, the hearing *v* $\frac{15}{20}$; had spasms at night. At the beginning of April (in four months) she had no perception of light, but the hearing was perfectly restored. Not long ago I accidentally learned that the child had died.

Not knowing what the intracranial lesion was, I may, nevertheless, from the symptoms draw the conclusion that the acoustic nerves may have been affected in a way similar to that of the optic nerves, only less intensely. Brain lesions in general, such as tumors, for instance, may possibly affect the acoustic nerves as often as the optic nerves, and if the conditions of strangulation—choked disc—are not present in the ear as they are in the eye, we may see the acoustic nerves recover their function, whereas the optic waste away.

A man, æt. 52, having chronic aural catarrh. H reduced to *V* R $\frac{2}{60}$, L $\frac{1}{60}$; the symptoms of Ménière's disease for years had been quite marked. He stated that his hearing and aural vertigo were always worse after coition, in which he had, matrimonially, indulged to excess for 33 years.

The 5 cases of **cerebro-spinal meningitis** were all in children; the deafness was binaural and absolute. One child died in the third week, after having been deaf for ten days. No autopsy. When I examined her during her illness her pupils reacted as usual; the optic discs and tympanic membranes were normal. She was completely deaf. None of the four surviving patients had eye disease.

The case of **one-sided deafness from mumps** was as follows:

A young lady, æt. 15, consulted me May 25, 1881. She had had mumps two months previously on each side, lasting two weeks. During the decrease of the swelling on the right side, she heard at first a ringing noise in her right ear, then a roaring noise which is still present, and her hearing became impaired. I found both *Mtt* normal, and one like the other; *h* R o, no bone-conduction; L $\frac{2}{24}$, bone-conduction good. *V* R $\frac{1}{60}$ (from sound reaching other ear), L *v* $\frac{2}{20}$. Tuning-fork R faint and even, L well and in puffs. When tuning-fork vibrates on forehead, and she closes her left ear, the sound is stronger; when she closes or opens the right, the intensity of sound remains the same.[1]

The case of **deafness from epileptic attacks** was that of a man of 37 years of age, who for many years had suffered from sleeplessness. Two years and a half before he consulted me he had had a sudden (the first) attack of epilepsy, which was followed by general weakness for three weeks. Two months later he had another attack, which repeated often during the day, and left him deaf. Noises ever since; hearing no better. I found the *Mtt* and middle ears normal, *h* o, T F o. He thought he heard loud voice, but could not understand it in any way. Optic nerves and sight normal.

The case of **deafness from malaria,** or cerebro-spinal meningitis, is very remarkable.

A young man of 17 years of age had always been well until the evening of the 20th March, 1881, when he had chills in the evening, lasting a few hours. He vomited during the night. The next morning he felt dizzy, was drowsy and delirious; he grew maniacal at noon, and totally unconscious in the evening; his temperature was high, and he vomited all he took. This condition lasted three days. Being the son of wealthy parents he was treated by several of the most experienced and renowned physicians of New York. At first morphine was injected. On the third day his consciousness returned. The physicians—with the exception of one who diagnosticated cerebro-spinal meningitis—

[1] Of late, I have also come across a case of double-sided deafness from mumps, in which, as in the case recently published by Moos (these ARCH., xi, p. 13), attacks of aural vertigo are still present, now six years after the disease.

thought he had a violent attack of malaria, and gave him, when he had awaked from his stupor, a dose of 2.5 grams of quinine which he kept, then 0.30 every two hours; from the next day 0.30 three times daily for several days. After the first dose of quinine he had most intense buzzing in both ears, which several days later disappeared from the right ear, but not from the left, which also has been deaf ever since. For six weeks he felt weak, and staggered. He went to Europe, had a very rough passage; also when he returned late in August, but was not at all seasick, whereas on former voyages he had always been very sick. When he consulted me, 22d Oct., 1881, I found nothing abnormal in either ear on physical examination; *h* R $\frac{3}{24}$, L $\frac{1}{\infty}$ (ear and mastoid), namely, the watch was heard when applied to the left ear and mastoid; it was better heard when at the time his right ear was held closed, but no better from the mastoid when the left was closed. Tuning-fork applied to the left mastoid, the same result; when vibrating on the forehead, it was heard on the right side only, better when the right ear was stopped, no difference when the left was stopped. The tuning-fork passed up and down before the left ear was heard evenly, the same as when passed up and down before the face, but in distinct puffs when moved before the right ear.

I declared, of course, the left ear completely and incurably deaf, the same as the one-sided deafness after mumps, but do not know whether the primary disease was malaria or cerebro-spinal meningitis. One-sided deafness from the latter disease does occur, but is very rare; I remember only one case from my own experience.

The patient had never before suffered from intermittent fever, nor does he live (57th Street, between Fifth and Sixth avenues, New York City,) in a particularly malarious neighborhood.

The case of **hardness of hearing from an explosion** in blasting rocks, to which the patient was quite near the day before he consulted me, I have entered among the diseases of the inner ear, because there was absence of abnormity in the sound-conducting apparatus. Politzer's experiment, however, raised the hearing acuteness somewhat, yet no higher than to *V* $\frac{15}{60}$. In the other ear the hearing was normal. We may, I think, assume that by the violent shock

from extraordinary strong sound-waves the cochlea can undergo changes like those which we ophthalmoscopically notice after concussion of the eyeball in the background of the eye, namely, a milky opacity and capillary hemorrhages in the retina, and small ruptures in the choroid and other tunics. The patient was not seen again, probably was well soon.

None of the ten cases which were entered as **deaf-mutism** showed any unusual features.

D—*Operations.*

The above table, p. 201, does not contain all the operations, as only such cases were noted in which the operation was an essential factor in the management of the case. Partial excision of hypertrophied tonsils, for instance, was not infrequent in the treatment of chronic otitis. I commonly perform this operation with a Yearsley's knife, holding and drawing out the part to be removed with a large pair of forceps, the fang-like teeth of which are on the side. When the tonsils, however, are large, and form round or oval, well-projecting lumps, I remove them with a guillotine tonsillotome. Only once in my whole practice has this operation been followed by profuse hemorrhage, occurring when the patient had returned to his house. It stopped from exhaustion.

The removal of **polypi** as I stated above, was commonly done with the forceps, at times also with the snare. I do not want to cite cases in confirmation of the remarks made before; one only may serve as an illustration.

A miner from the West had been suffering from otorrhœa in one ear for many years. Off and on he had been treated by different aurists, who "worked at his ear, pulling, cutting, crushing, burning, for months at a time." Finally he became disgusted and thought he would leave his ear alone. For more than a year he did nothing than syringing it when the discharge was annoying and offensive. At last, however, he had become totally deaf in that ear and had repeated attacks of severe headache. He had, therefore, decided, he said with an ironical smile, to "try Eastern medical talent."

I found the ear filled with a firm polypus, which, as I ascertained by probing, had a small attachment in the depth of the canal. I grasped the growth at its root with Hinton's forceps and drew it out entire at the first attempt, and so easily that the man on seeing it said to me: "It seems, sir, you have been in that pit before." I syringed the ear, found a large perforation of the *Mt*, the mucous membrane of the drum cavity swollen, but no secondary polypi. Treatment with boracic acid powder and alcohol reduced the swelling of mucous membrane to the normal, stopped the discharge, and re-established moderately good—$V\frac{20}{60}$—hearing. The patient returned home in a month with a perforated *Mt*, but no trace of a polypus.

The cases of **paracentesis of the Mt** furnish no opportunity for remarks of particular interest. In one where the inflammation had spread from the tympanic cavity over the osseous portion of the ear canal and the mastoid region, the paracentesis, liberating muco-pus, had to be supplemented by a deep incision, down to the bone, in the canal, as well as behind the ear, in the mastoid region. From both places pus was evacuated.

One of the two cases in which the **mastoid was opened,** is reported above; the other is reported in these ARCHIVES, vol. x, p. 365. It is the case in which I chiselled through a sclerosed mastoid process and opened the lateral sinus. I may here add that the patient is still doing well, pursuing her studies, and has been free from her previous distressing headache ever since the operation. The case in which the small *exostosis* was *chiselled off* is reported in the first part of this paper.

Operations reputed to improve hardness of hearing and cure noises, I mean paracentesis of a non-inflamed drum-head, division of the posterior folds, tenotomy of the tensor tympani, and the like, I have not done during the past few years.

TOTAL ABSENCE OF BOTH LABYRINTHS OF A DEAF-MUTE; WITH EMBRYOLOGICAL AND PHYSIOLOGICAL REMARKS.

By S. MOOS and H. STEINBRÜGGE, of Heidelberg.

Translated by H. Knapp.

WE owe to the kindness of Dr. E. Fränkel, pathologist to the Hamburg Hospital, two petrous bones, removed, according to Schalle's method, from the body of a 35-year-old deaf-mute, who had died from consumption of the lungs, larynx, and intestines.

A general inspection of the specimen shows: Skeleton thin, almost child-like. Mastoid processes small, with well-developed pneumatic cavities. In the left ear-canal a plug of ear-wax. Right ear-canal large; drum-head normal.

Nasal passages and Highmore's antra normal. A spinous projection at the right side of the nasal septum. Uvula large and stiff, soft palate thick. Tonsils hard and tough, with numerous follicular depressions. Mouths of tubes apparently normal. A large quantity of rather fluid mucus escapes from the right pharyngeal orifice. Fibrous cords and mucus in Rosenmüller's fossæ. At vault of pharynx nothing abnormal. Tubes normal on inflation.

Macroscopic Appearance of Left Petrous Bone.

After removal of the plug of cerumen a small round perforation is noticed in the antero-superior quadrant, and an atrophic spot (cicatrix?), the size of a small pea, in the postero-inferior quadrant; hammer-anvil joint normally movable.

Long process of anvil and tensor tympani muscle united to the labyrinth wall by slender connective-tissue ligaments. An ordinary whale-bone probe passes readily through the osseous tube; the floor of the tympanic cavity is very flat, hyperostotic in the direction of the jugular fossa. The margin of the round window sharp; membr. secundaria not visible.

The roof of the tympanic cavity and mastoid antrum thinned. The region of the arched eminence flattened, and interrupted by a very deep furrow of the superior petrosal sinus.

The major and minor superficial petrosal nerves well developed.

Macroscopic Appearance of Right Petrous Bone.

At the roof of the tympanic cavity the same thinning as on the left side. Ossicles normal. The tendinous attachment of the tensor-tympani muscle at the neck of the hammer enlarged by fibrous tissue. The long process of the anvil likewise united to the labyrinth wall by a fine thread. Osseous tube well pervious. The entrance to the round window is directed more forward than backward, so that it can be looked into from in front. On this side also the osseous margin is sharp and somewhat notched.

Investigation of the Right Labyrinth.[1]

An oval, osseous nucleus, 6 *mm.* long, 3 *mm.* wide, was in front of the internal ear-canal. After the pyramid had been cut through vertically to its longitudinal axis—the section passing through the posterior third of the plate of the stirrup—*no space corresponding to the vestibule could be detected on either cut surface, nor was the calibre of a semicircular canal or an ampulla to be seen.* Nothing was seen but the smooth surface of the divided bone, colored green by the osmic acid. Upon this surface the above-mentioned yellow osseous nucleus, the facial nerve transversely cut and

[1] The petrous bones having been sent in Müller's solution, were treated with 1-per-cent. solution of osmic acid for twenty-four hours, and decalcified according to the method mentioned several times before.

colored black by osmic acid, and a spot, 2 × 1 *mm.*, likewise darkened by osmium and situated close behind the plate of the stirrup, were distinctly marked. The microscopic examination of cross-sections, carried in the same direction, discovered in the last-mentioned spot a cavity filled with a network of delicate connective-tissue fibres and black globules of fat, evidently a rudiment of the vestibule which either had remained undeveloped or become *atrophied in the fœtal period.* In the upper part of this place the canaliculi of the branches of the vestibular nerve were clearly visible, and in teased preparations the normal structure of these nerve fibres could be ascertained.

The structure of the plate of the stirrup was by no means uniform. The small posterior part was osseous; the larger anterior part, with the exception of an islet of cartilage, ligamentous. The orbicular ligament was distinctly recognizable in the osseous sections. The connective tissue of the ligamentous part of the plate was directly continuous with that which filled the rudiment of the vestibule. The edge and vicinity of the oval window was lined with cartilage. Numerous pseudo-ligaments were found between the limbs of the stapes and in the niches of the oval and round windows. In sections passing through more anterior portions the canaliculus of the cochlear branch leading to the frontal ampulla was seen, and contained nerve fibres, which, however, seemed to terminate in the bone tissue. In the same sections in which the membrane of the round window was visible, there was the beginning of a small canaliculus, which passed from the depth of the round window toward the interior, contained in its superficial portion some black globules of fat, and was probably the rudiment of a cochlear scala. It was lined with several layers of polygonal pavement epithelium, and led into two cavities, which in their anterior portions were separated by an osseous, in their posterior by a fibrous partition-wall, and lined with the same epithelium. One of these cavities was filled with a substance resembling coagulated lymph, and interspersed with numerous crystalline needles; in the wall of one of these cavities a spherical body was situated, with concentric layers and the

same epithelium. Subsequent sections showed the two cavities united into one of biscuit-shape, which in the last sections completely disappeared. Apart from these meagre discoveries *no trace of a cochlea* was found. In the posterior (external) portion of the pyramid the above-described rudiment of a vestibule could be followed up, becoming smaller and smaller, in two or three sections; and above it the transversely cut canaliculi, with the nerve of the vestibular branch, were noticeable. They had evidently been destined to supply the ampullæ of the sagittal and horizontal semicircular canals. It was very surprising to find neither a trace of the ampullæ nor the semicircular canals, apart from a short osseous canaliculus running horizontally above the canal of the facial nerve, which might have been taken for a rudiment of the horizontal semicircular canal. We failed, however, to find the structure of a membranous semicircular canal in the corresponding canaliculus, which was filled only with delicate connective tissue.

Examination of Left Petrous Bone.

In the cut section of the pyramid, made in the same direction as on the right side, a similar osseous nucleus was seen, together with a rudimentary vestibular cavity of 3.5 *mm.* in height and 1.5 in width, and equal contents. Besides, there was a lymphatic, partially filled with fat, tinted black by osmium. The vestibular nerves also resembled those on the other side; pseudo-ligaments in the niches of both labyrinth windows. The membrane of the round window was complete; the inspection of sections showed, however, that immediately behind it (toward the cochlea) a second partition-wall appeared, which was osseous and barred the entrance of a small cavity filled with black globules (rudiment of the scala tympani).

The foot-plate of the stapes was ill-defined toward the orbicular ligament, for with the exception of a few scattered cartilage cells, it consisted entirely of connective tissue; a small bony islet was situated at a place corresponding topographically to the edge of the ligament.

A section of the posterior *limb of the stapes* showed also

in this case[1] a slipper-shaped cone, whose bony rim was sharply defined from the remaining fibrous tissue. The centre of the *capitulum* contained a small osseous nucleus.

Some normal muscular fibres were within the pyramidal eminence.

No trace of semicircular canals, ampullæ, or cochleæ.

Condition of the Nerves.

The trabecles of the arachnoidal coat in the internal ear-canal contained an unusually large number of differently shaped concrements of phosphate of lime. Some trabecles were themselves petrified, and some concrements were situated in the walls of the vessels. Macroscopically, the facial and acoustic nerves, completely laid bare by chiselling open the canals as far as the hiatus of the Fallopian canal, showed nothing extraordinary, except that the acoustic nerve was somewhat thinned. The facial, examined in cross-sections, appeared divided into about ten smaller or thicker bundles by partition-walls formed from the interfascicular connective tissue; the single nerve fibres, microscopically examined, were, however, normal.

The acoustic nerve, treated as above mentioned with osmic acid, showed remarkable changes under the microscope. A portion of the nerve fibres and some ganglionic cells contained within the nerves appeared normal; another portion was replaced by connective tissue, and the contents, color, and configuration of its fibres were altered. While a part of the nerve fibres still exhibited the usual medullary appearance, others in their immediate neighborhood were scantily supplied or totally deprived of marrow. The reagent, consequently, colored some black, others pale gray, and others not at all, and their diameter was either normal or more or less reduced.

The very frequent occurrence of varicosities was especially conspicuous. Apart from a great number of normal, in particular normally wide fibres with many varicosities,

[1] See our article on the combined occurrence of rachitic changes, and disturbances of development in the auditory organ of a crétin. These ARCHIVES, vol. xi, p. 1.

we found in teased preparations *an exceedingly great number of extremely small, medullaless, black or brownish-yellow fibres with numerous sinuosities.* Some nerves on account of the great number of varicosities had the appearance of rosaries.[1] Furthermore, a great number of isolated or aggregated round hyalin globules were seen.[2] The normal nerves, on teasing, were preserved in longer portions, whereas the varicose were broken into short segments. This condition is analogous to that found and described in nephritic, traumatic, or other forms of retinitis, further in the brain and spinal marrow when both the white and gray substances are affected, in the processes of the ganglionic cells, and in the axis-cylinders (Virchow, Hadlich, Roth); of late, also, in the axis-cylinders of a diseased abducens (Leber).

The modiolus and the cochlea, as we have already mentioned, were completely absent; the last twigs of the nerve, accompanied by a branch of the a. auditiva, penetrated a short distance into the bone, where they could no longer be followed.

From the preceding, it is evident that we had to deal with an atrophic process of the auditory nerve which, however, left one part of its fibres intact. The condition of the marrowless, varicose nerve-fibres must also be considered as the result of atrophy, because the morbid process destroyed the medullary substance but not the axis-cylinder. The reasons for regarding this condition as pathological are as follows: 1. The absence of changes in the adjacent facial nerve. 2. The uniform occurrence of the alterations in both acoustics. 3. The alternation of varicose nerve-fibres with normal medullary ones in some nerve-tracts. The occurrence of the varicosities might, perhaps, be considered as artificial; namely, as the effect of the osmic acid, but this would be at variance with the fact that the above-cited pathological condition was met with in other morbid processes without employment of osmic acid.

[1] Much thinner than in the case of nerve atrophy in the first cochlear convolution, described by us before and illustrated with drawings. These ARCHIVES, vol. x. p. 1.

[2] Their pale, dull appearance, despite the application of osmic acid, excludes every suspicion of fat, confounding them with fat globules.

Physiological Explanation of the Nerve Atrophy.

We believe the atrophy was the result of inactivity. This supposition cannot be shaken by the fact that the whole nerve did not waste away, for a total atrophy from disuse has thus far not yet been observed in any organ, and its occurrence in our case would be surprising, as the nerve had remained in connection with the central organ and its own nutrient vessels.

The normal structure of the muscles in the tympanic cavity is not astonishing either. From theoretical reasons we might have anticipated to find them also partially atrophied by inactivity, provided that their functions be required only for acoustic purposes. This is, however, not the case, for they contract in association with other groups of muscles, being then innervated by the fifth pair and the facial. The tensor tympani muscle shows a concomitant action during deglutition; the stapedius muscle, during the contraction of certain muscles innervated by the facial, especially during the closure of the eyes. A normal structure of the tensor tympani muscle, in conformity with the reasons stated above, has been found by one of us in two deaf-mutes.[1]

Embryological Deductions.

The conditions just described confirm anew the supposition of an independent development of the different regions of the auditory organ: *the auditory vesicle only was disturbed in its development.* We leave it undecided whether the disturbance was the result of an original defective formation in the labyrinth vesicle, or of a premature total ossification of normal formations in consequence of early irritative processes.

The stapes deserves a special consideration. Its condition, described above, is at variance with the opinion of Parker, Gruber, and others, that the stapes develops from the labyrinth capsule through cellular proliferation. The result of our examination is rather in favor of the older supposition of its independent development from the second branchial arch.

[1] Results of dissection of ear-patients, Cases 7, These ARCHIV., vol. iii and vii.

REPORT ON THE PROGRESS OF OTOLOGY FOR THE FIRST HALF OF THE YEAR 1882.

I.—NORMAL AND PATHOLOGICAL ANATOMY AND HISTOLOGY OF THE EAR.

By H. STEINBRÜGGE, Heidelberg.

Translated by Richard C. Brandeis, M.D., New York.

1. Hensen. Addendum to my remarks against the cupula terminalis (Lang). *Archiv für Anatomie und Physiologie*, Anatomical Department, 1881, No. 6.

2. I. Baratoux. Pathogeny of the diseases of the ear. Anatomo-histological part.

3. Lucae, Berlin. On hemorrhage and hemorrhagic inflammation of the labyrinth of children. *Virchow's Archiv*, vol. lxxxviii, 1882.

4. Hermann Krause, Vienna. Two *post-mortem* examinations of simple ozæna. *Virchow's Archiv*, vol. lxxxv, 1881.

5. Eugene Fränkel. Pathological contributions from the Hamburg Hospital. 1. On intestinal cysts. 2. Contributions to rhino-pathology. *Virchow's Archiv*, vol. lxxxvii, 1882.

6. Max. Schaeffer. Nasal polypi. From an address delivered before the Medical Society of Bremen. *Deutsche med. Wochenschrift*, No. 23, 1882.

7. E. Zuckerkandl. Normal and pathological anatomy of the nose and its pneumatic cavities. Vienna, 1882. Braumüller.

8. Vitus Graber. The chordotonal organs of special sense and the hearing of insects. *Archiv für microsc. Anatomie*, vol. xx, part 4, and vol. xxi, part 1.

9. A. Hannover. The primordial cartilage and its ossification in the human skull previous to birth. *Nord. med. Archiv*, vol. xiii, part 2; also *Lond. Med. Record*, 1882.

1. HENSEN summarizes the results of his examinations on the terminal filaments of the crista acustica and cupula terminalis (published in the same journal, 1878, pag. 486), and also reports new and very interesting observations which cannot well be condensed.

If we were to attempt to reconcile Hensen's views of the cupula with those of his opponents, we would have to proceed as follows: A distinct, organized structure, which might be termed the cupula terminalis, does not exist during life. We learn from the author, however, that upon the crests of the ampullæ, between the terminal filaments and in their immediate vicinity, there is a mass, which is chemically different from the rest of the endolymph, of a colloid nature, in a living or fresh condition transparent, and therefore not visible with a low power of the microscope. After being treated with nitric, chromic, or osmic acid, or with alcohol, this substance coagulates, and with the terminal filaments goes to make the peculiar, striated structure which Lang calls the cupula terminalis.

2. BARATOUX in the first chapter of his monograph gives us a clever review of the normal anatomical conditions of the labyrinth, which will afford the reader, who is already conversant with the histology of the labyrinth, a convenient résumé of all that is most worth knowing. By employing great brevity and conciseness, the author has been able to treat fully of the anatomy, embryology, and morphology of the labyrinth within a space of 37 octavo pages. This is the more surprising as not only the histology of the cochlea, the vestibule, the semicircular canals, the arteries, veins, lymphatics, and nerves of the ear are discussed, but we also have the sympathetic, the trigeminal, facial, glosso-pharyngeal, the nerve of Wrisberg, and the cervical plexus treated of in detail, while even the central origin of these nerves is also considered. As every one who concerns himself at all with the physiology and pathology of the ear must be familiar with all the elementary and gross anatomical facts given, we hardly deem it necessary to enter into an elaborate consideration of this part, but will merely discuss some of the points which are at variance with the views generally entertained.

Ranvier found two prolongations on Deiter's cells, of which one is supposed to attach itself to the lamina reticularis, and the other to the membrana basilaris. Besides this, Ranvier says that there is a depression on that side which Corti's cells touch.

These assertions, as well as the succeeding description of the spiral ganglion in the canal of Rosenthal and of the fibres of the cochlear nerves, probably refer to some specimens derived from one of the vertebrata. In the human cochlea the conditions, in part at least, do not correspond to the above description. The ganglionic cells of the human cochlea do not, as in dogs and squirrels, lie in one heap, thus forming a chain of ganglia passing through a spiral canal, but they are irregularly distributed in the cavities of the spongy tissue. We therefore cannot accept the author's assertion, that each one of the branches of the nerves which has passed into Rosenthal's canals represents "un renflement ganglionnaire."

In considering the vessels of the membrana tympani, the cellular tissue lying beneath the lower cells of the epidermal covering is termed a "couche muqueuse" while the real layer of mucous membrane is called a "lame muqueuse." According to Baratoux, the aqueductus vestibuli contains a branch of the middle meningeal artery; the aqueductus cochleæ, a branch of the internal carotid artery. In the section devoted to the consideration of the veins, he mentions Weber-Liel's correct assertion, viz., that there is a canal, running parallel with the aqueductus cochleæ, which extends to the scala tympani, and which evidently serves to transmit a vein. Under the subsection of the petrosal nerves, we find to our surprise, that the branch of the glosso-pharyngeal which is known as Jacobson's nerve, is called the nervous petrosus profundus; while another nerve, *i. e.*, the nervus petrosus superficialis minor, arising from the facial nerve, is also said to terminate in the otic ganglion.

3. LUCAE's case is entitled to especial consideration, because the *post-mortem* revealed to him a means of transmission of inflammatory processes from the meninges to the labyrinth which has, hitherto, failed to attract attention. By bearing this in mind we will henceforth be able to explain many of those cases of sudden deafness which are so often observed in children.

A boy, aged $3\frac{1}{2}$ years, was affected with symptoms of a mild attack of cerebro-spinal meningitis. On the tenth day he had already begun to manifest signs of improvement, but the day after sudden deafness set in. During the three previous days the patient had complained of intense tinnitus. On examination it was found, that on the left side there was slight injection of the handle of the malleus; and on the right side, an old cicatrix in

the posterior superior quadrant. Symptoms of meningitis, with strabismus, very soon returned. Lucae again examined the patient three weeks after the relapse began. He found great emaciation, insensibility, vomiting. About eight weeks after the illness first began, the case terminated fatally in consequence of what appeared to be a tuberculous basilar meningitis, although three days previous to this the patient appeared to be mending rapidly.

The *post-mortem*, which was limited to the skull and its contents, revealed a condition which pointed to internal hydrocephalus, with tendinous thickening of the pia mater at the base of the brain. Submiliary nodules were found along the course of the vessels of both fossae Sylvii.

The dura mater covering the petrous bone was of a reddish blue-green color. There was a reddish discoloration of the bone in the region of the posterior and superior semicircular canals. The osseous canals, especially the superior and posterior, were filled with recent dark-red coagula and fluid blood. The vestibules were also filled with blood ; the cochlea not so much so. Pus corpuscles were also found in the canals. The condition of the discolored, carious membranous parts of the labyrinth was similar to the above. The vessels of the lamina spiralis were greatly congested ; Corti's membranes, on both sides, enormously thickened ; no evidences of tubercles discoverable in the labyrinth.

Lucae refers again to the two periods of the disease, and, agreeing with Dr. Wernicke, who performed the autopsy, assumes that as the tubercular meningitis was progressing favorably, the fatal issue was probably due to a general miliary tuberculosis. We might, therefore, be justified in presuming that the first attack, which was diagnosticated as cerebro-spinal meningitis, might have been due to the tuberculous dyscrasia, if it were not explicitly stated that it presented all the features of an epidemic form of cerebro-spinal meningitis. It is surprising that there was no vertigo as well as deafness, which was undoubtedly due to the hemorrhages. Lang, who attributes it to "changes in the intra-cerebral pressure," when it appears in the course of a disease of the labyrinth, believes that there was no vertigo, because "owing to the meningitis (hydrocephalus internus) the pressure *was* lessened from the very beginning."

On examining more closely, however, Lang also found that

a reduplication of the dura mater, richly supplied with vessels, extended into the hiatus subarcuatus. A further microscopic examination of sections of the very vascular bone, as well as of other sections which had been decalcified by means of a 10-per-cent. solution of hydro-chloric acid, verified the author's supposition that the inflammation had extended by this route from the brain to the labyrinth. The vicinity of the semicircular canals was filled with very large spaces containing marrow cells—blood and pus corpuscles, as well as a puro-sanguinolent fluid. The membranous labyrinth was so broken down that no microscopic sections could be made. The vestibular branch, as well as the ramus cochleæ, contained normal nerve-fibres. There was evidently an osteo-myelitic condition of the spongy substance enveloping the labyrinth, which was followed by a hemorrhagic inflammation of the membranous labyrinth. Lucae now proceeds to consider the question whether the marrow spaces described above, as found in the neighborhood of the semicircular canals, should be considered in children as normal or pathological developments. Henle, who had the question put to him, answered that he had found them in some petrous bones of children, but failed to do so in others, and that he did not think that they were of a pathological nature. We now have the results of another autopsy, made on a male infant, aged seven months, that died of a gastro-intestinal catarrh, complicated with a bilateral otitis media purulenta. In this case similar hyperæmias and bloody extravasations were found in the enormously enlarged marrow spaces of the spongy portion of the labyrinth, and also in the bony canals. Lucae doubts the probability that the extension of the inflammation was due to the vascular anastomoses between the mucous membrane of the tympanum and the labyrinth (first described by Politzer), and is inclined to attribute it to the vascular connection between the fissura petro-squamosa and the dura mater and from there to the labyrinth, by means of the vasa subarcuata. In a third case only a few narrow and elongated marrow spaces and hyperæmia of the bony and membranous semicircular canals were found.

Lucae ascribes to the spongy tissue surrounding the capsule of the labyrinth as well as to the vessels penetrating the petrous bone, an important rôle in the physiological nutrition of the labyrinth and its disturbances in early infancy.

4. KRAUSE gives us the *post-mortem* appearances in two cases

of ozæna. In neither of these cases was the disease complicated by ulcerations or by any carious disease of the bone, but was simply due to pathological conditions which caused atrophy of the nasal mucous membrane. The first case was that of a man, aged 52 years, who died of cirrhosis of the liver; the other was a woman who died in consequence of chronic tuberculosis, Bright's disease, and diphtheria. Among the many interesting facts revealed by the microscopic examination of numerous sections taken from different portions of the turbinated bones, the most important are: Infiltration of the subepithelial layer, with innumerable round and spindle-shaped cells in a state of fatty degeneration; numerous accumulations of fat-granules, and larger and smaller globules. Beneath this layer there was organized, tough connective tissue. The adventitia of the arteries was thickened; the intima in folds; the venous spaces, with thickened coats, were tortuous, angular, and of narrow calibres. (The Reporter has noticed this condition in normal nasal mucous membranes, and has described it in vol. viii of these ARCHIVES.) The glands were partly atrophied and had, in part, disappeared altogether. In some specimens one could follow the migration of the oil globules from the lower portion of the mucous membrane to the surface. The bony portion of the turbinated bones was destroyed in parts. The whole mucous membrane lining the nasal cavity was more or less atrophied. The condition of the mucous membrane lining the adjacent cavities was similar to that already described, but not in so marked a degree. The crusts were composed of epithelium in a state of fatty degeneration, of oil globules and margarine crystals.

Krause has proved that a part of the cellular infiltration has been transformed into connective tissue, thereby promoting contraction, while the remainder degenerated into mere detritus.

The degeneration of the glands is not only due to the constriction exercised by the newly formed and contracting connective tissue, but also to the changes in the vascular supply and the disturbances of nutrition which ensued therefrom.

The conditions found in xerosis of the conjunctiva and in callous stricture of the urethra are quite similar. The question arises, whether the atrophy of the nasal mucous membrane may not occasionally be due to infection from a gonorrhœal ophthalmia.

Krause attributes the fœtor of ozæna to the degenerated cel-

lular derivatives, which, undergoing fatty metamorphosis, rise to the surface, forming, with the detached epithelium, scabs and crusts, which soon become transformed into fatty acids. The diminished secretion, due to the changes in the vascular supply and the atrophy of the glandular structure, favors this state of affairs. The suspension of the chemical influence of the glandular secretion must also be borne in mind.

As affections of the adjacent cavities are not constant, and, even if present, the disease of the nasal mucous membrane is always paramount, Krause cannot accept Michel's theory.

The anosmia is due to the destruction of the olfactory cells. The pathologico-anatomical changes make it apparent that the mucous membrane cannot be fully restored to its normal condition. We can only hope for success if we are able to transform, by means of energetic cauterization, also the superficial layers of the mucous membrane into cicatricial tissue. A few cases in which the ozæna was cured are appended to the paper.

5. The second part of FRÄNKEL'S paper is devoted to contributions to rhino-pathology, more especially that form of rhinitis chronica atrophicansfœtida, which is now termed "simple ozæna." His more recent anatomical investigations as to the nature of this disease, conjoined with his clinical experience, tend to confirm him in his original views, which agree with those of other investigators. As far as the anatomical changes are concerned, we have a diminution in size of the turbinated bones, which entails a dilatation of the fossæ, a degeneration of the mucous membrane into a form of connective tissue, and an obliteration of its mucous membrane. The dilatation is the final issue of a rhinitis which first was hyperplastic, and later led on to atrophy. Thus Zaufal's theory, that the dilatation of the nasal passages was the predisposing cause of the ozæna, lacks authentication.

We next have the results of a *post-mortem* examination of a man, aged 45 years, dying of consumption, who had suffered from ozæna for many years before. The cavernous tissue of the inferior turbinated bones was entirely wanting. The epithelium of the very atrophic mucous membrane was intact, and there were no evidences of loss of substance whatsoever; on the other hand, it was completely infiltrated with small round cells, the glands could only be found in the respiratory region, while those in the olfactory region were almost entirely gone.

Fränkel acknowledges that the clinical and anatomical images

do not quite harmonize, inasmuch as fœtor is sometimes noticed in the hypertrophic stage, that is, before atrophy sets in. It is possible, however, that at this time there may also be a disseminated atrophy which is not recognizable during life. It is questionable whether there need always be a period of hypertrophy, and whether the atrophy may not be primary.

In regard to the etiology, it may be said that five out of six cases of ozæna, in which *post-mortems* were made, were tuberculous; and ozæna appears to be due, in part, to scrofula, but it is difficult to trace any relation between it and syphilis.

As far as the treatment is concerned, it must be borne in mind that the glands, when once destroyed, cannot be restored. When atrophy has once set in, a radical cure must be impossible. Fränkel recommends the use of Gottstein's tampons, as a palliative measure; and not only because they stimulate an increased secretion, thus preventing incrustations, but also an account of the fact that they prevent the entrance of bacteria, and other foreign bodies floating in the atmosphere, into the nasal cavity. The mucous membrane which has undergone a pathological change, and whose secretion must be chemically altered, owing to the disappearance of the glands, is a very excellent breeding-place for bacteria, which contribute not a little to the intensity of the fœtor.

In conclusion, Fränkel gives us an exhaustive analysis of the case of tuberculous ostitis of the septum narium, which occurred in a little boy, five years of age, who had tuberculosis of the neck of the right femur. This case has already been reported in volume x of this journal.

The *post-mortem* showed that the tuberculous infiltration of the mucous membrane of the left side of the septum was only a secondary result.

6. SCHAEFFER tabulates 120 cases of nasal growths. Of these, 102 were mucous polypi, 7 teleangiectatic tumors, 8 fibromata, and 3 carcinomata. They were found in 76 males and 44 females, and were most common between the ages of 30 to 40 years.

Schaeffer removed a number of mucous polypi which were situated on the floor and the vault of the nasal cavity, and also several which arose from the septum. He refers to Billroth's treatise for a description of the minute structure of these growths.

7. ZUCKERKANDL'S monograph not only includes all his previous contributions on the subject (see *Med. Jahrb.*, 1880, and

Wien. med. Zeit., 1881, No. 9), but also his more recent investigations, which consider the minutest details of the macroscopic normal as well as the pathological anatomy of the nasal region. Anatomists, surgeons, and rhinologists owe thanks to the author for publishing this exhaustive work, which is based on the examination of no less than 300 cases. The monograph is profusely illustrated.

As we have already reviewed the author's previous contributions to the physiology and pathological anatomy of the nasal cavity and its pneumatic adnexæ, we will, on this occasion, only call attention to the more novel facts which he has given us. Among the first of these is a summary of the views of the older anatomists as to the contents and appearance of the cavities connected with the nose. These were generally supposed to be filled with a medullary mass, or with mucus; while, on the other hand, Riolan, Highmore, and especially C. Schneider, already recognized the fact that they were only pneumatic cavities. Many years elapsed before these views began to prevail generally, and even in recent times there were some anatomists who taught that the physiological function of these cavities was to secrete mucus. Zuckerkandl states positively that in health no mucus is found in these parts. The most marvellous views were current as to the physiological importance of these cavities; they were supposed to generate the spiritus animalis from the atmospheric air, to purify the inspired air, to absorb mucus from the cerebral ventricles, to increase the sonority of the voice; and last, but not least, to act as accessory to the olfactory organ. In reference to the last theory, Zuckerkandl refers to the experiments of Dechamps, Richeraud, and Hyrtl, and calls attention to the fact that no branch of the olfactory nerve is discoverable either in the adjacent cavities or the ethmoidal cells; thus all perception of smell is rendered impossible.

In reference to the method of preparing the sections of the head, sagittal and frontal sections are recommended, and the author advises us to begin with a sagittal division. Where it is desirable to obviate any mutilation of the body, Schalle's method is recommended. In the description of the anatomy of the nasal cavity many features which are not quite normal are described. Among those not so well known we have, for instance, one of the constant bilateral deviation of the middle turbinated bone to the same side, by means of which the olfactory fissure is considerably

enlarged. Furrows, incisuræ, and indications of a division, such as are often found in the superior bone, are occasionally noticed in the middle turbinated. The external wall of the nasal cavity is more fully described, because, aside from numerous differences in contour, it contains the sinuses leading into the maxillary and frontal cavities. The relations of the processus uncinatus, as well as that attachment of the ethmoid which he terms the *bulla ethmoidalis*, between which we find the orifice of the hiatus semilunaris, we know already from his previous writings. The hiatus contains the foramina of the antrum of Highmore, and of the sphenoidal cells, which are also in communication with the ethmoid bone. Its anterior end, the infundibulum, leads to the frontal sinus. In addition to the above the openings of other foramina are found on the outer wall, but these are generally covered, during life, by mucous membrane. Their shape and number depend on certain variations in the shape of the processus uncinatus.

In respect to the septum narium, attention is called to the frequent persistence of the cartilage, which is found in the newly born between the two plates of bone, and the increased thickness of the septum in the respiratory region. This is due to an intumescence of the mucous membrane. Among 370 bodies, Zuckerkandl found deviations of the septum in 140 instances; they appear to be less frequent in those not of European birth. The deviations are generally only found in the anterior two thirds of the septum. A hook-shaped process is sometimes developed from the remains of the cartilages (107 times in 370 European heads). This is also less frequently found in non-Europeans.

No branches of the olfactory nerve are to be found on the lateral surfaces of the middle and superior turbinated bones. The respiratory surface is greater than the frontal. The expired air cannot easily enter into the olfactory region, owing to the dependent position of the sphenoid bone and the prominence of the middle turbinated. When the breath is tainted the patient himself is often not aware of the fact. On the other hand, the horizontal plane of the openings of the nostrils allows the inspired air to enter the olfactory region, so that all odors can be perceived. That this is so is proven in those cases in which disease has caused a depression of the cartilages of the nose so that the nostrils look out vertically, the inspired air passes, through the

respiratory tract, directly into the nasal fossæ, without any distinct sense of smell.

Of the diseases of the nasal cavity we have descriptions of inflammatory processes, of polypi, true atrophy of the turbinated bones, synechiæ, perforations and fractures of the septum, and of mucous cysts.

Polypi are divided into five groups: 1, hypertrophy of mucous membrane; 2, true polypi with broad or narrow pedicles; 3, small warty growths; 4, polypoid granulations; and 5, papillomata.

The majority of these arise from the superior turbinated, from the margin of the hiatus semilunaris, the borders of the ethmoidal foramen, the infundibulum, and the middle and superior meatus. They were never found to arise from the superior or inferior nasal surface, nor from the inferior turbinated bone (compare M. Schaeffer to the contrary). Polypi situated in the cavity of the infundibulum, or near the opening of the maxillary, sphenoidal, or ethmoidal sinuses, cannot be grasped at their base by any snare, so as to be radically cured. We must, therefore, be prepared for relapses, although these may not be very frequent.

We now have a consideration of the influence which these growths exert upon the nasal cavity and its contents; to which is added a section on the true atrophy of the turbinated bones and its etiology. Zuckerkandl does not believe in congenital atrophy. He agrees with those who consider this process as the result of a chronic blenorrhœa, and who think that hypertrophy must always pre-exist. Whether the adjacent cavities are also involved or not, is a matter of indifference.

Attention is next called to the synechiæ between the turbinated bones and the walls of the nasal cavity, which may be congenital as well as acquired; also perforations of the cartilaginous septum (8 times in 150 cases), and next cysts of the mucous membrane.

Another chapter treats of the anatomy and pathology of the pneumatic cavities, beginning with the maxillary sinus, its dilatations and contractions. Atresia of the maxillary antrum is very common; Zuckerkandl having found it in 56% of all cases, and in 25% it was in connection with asymmetry of the face. This cavity may also be divided into two parts, one above the other, and each having sinuses passing into the nasal passage. Besides

the prominences of the alveoli and bony projections, the dental nerves are sometimes visible on the inner surface, which, owing to a deficiency of their bony canals, may be in immediate contact with the mucous membrane, and, when this is diseased, give rise to neuralgias. In health, the mucous membrane is plicated and contains acinous and tubular glands ; in the embryo and new-born it is so much swollen that, instead of a cavity, only a fissure, lined with epithelium and mucus, is visible. The mucous membrane is separated from the bone by a delicate periosteum.

The chapter "On the pathology of the maxillary sinus" opens with a consideration of the inflammatory processes of its lining, which generally extend from the nasal cavity. In some cases disease of the bone or of the teeth may be the predisposing cause ; catarrh, both mucous and purulent, and also diphtheria occur.

In chronic catarrh the periosteal layer is involved, and becomes greatly thickened in consequence of serous infiltration.

In diphtheria no membranes are found, but the mucous membrane swells and becomes ecchymosed and œdematous. Zuckerkandl also assumes that closure of the sinus may cause absorption of air contained in the cavity and an exudation *ex vacuo*.

If it is necessary to trephine the antrum it is best to perforate the inner wall just below the infundibulum. Small flakes of bone are often found as the residua of inflammation ; these are sometimes embedded in the lining membrane, and thus explain the existence of movable bony growths in the maxilla.

We also have, among the tumors of the maxilla, osteomata, fibromata, polypi, and cystst of he mucou smembrane. The etiology of the latter is still in doubt ; and most authors agree that they are dependent upon disorders of dentition and deformities of the teeth. An ossified fibroma was found in the left antrum ; this was enclosed in a bony envelope and did not cause any visible disfigurement. This fact is of diagnostic value, inasmuch as these growths by pressing upon the infra-orbital nerve may cause facial neuralgia.

We next find the anatomy of the frontal sinuses, their variations in size as well as total absence. Z. does not agree with Steiner that these are formed from the ethmoidal cells. The canal leading to the frontal sinuses is situated in the anterior part of the infundibulum ; another between the process of the anterior end of the middle turbinated and the processus uncinatus or one of the ethmoidal cells.

Among the pathological conditions we first find inflammations, the results of pre-existing disease of the mucous membrane of the nasal cavity. Catarrhal diseases are either simple or purulent. Owing to their position any exudations which may collect in these cavities can be easily evacuated. We also have perforations, which are either congenital or due to atrophy ; osseous growths, and cysts.

The sphenoidal cavities vary greatly in size. They may be excessively large or very small. The sphenoidal sinus terminates in a special fissure just beneath the vault of the nose. Its diseases are the same as those of the other cavities. Among the most interesting of the anomalies of the ethmoid bone is the gaping of the lamina papyracea, with opening of the ethmoid cells into the orbit, as this may give rise to an emphysema of this cavity.

8. GRABER has recorded the results of his investigations of the auditory organ of insects in an exhaustive monograph.

He terms certain terminal portions of nerves which are found in different parts of the trunk (truncal) and on the limbs (membral) the chordotonal organs. They contain peculiar nerve terminations called scolopes (σκόλοπες, *i. e.*, styles or thorns) from which the term scolopophorous organs is derived. Besides the filamentous organs they are also found in the "tympanal apparatus" of many insects, where they were first found by v. Siebold, in 1844, in the orthoptera, and later by Leydig in other classes of insects. Graber divides them into poriferous and primitive, according to the parts of the integument under which they are situated, and whether or not they are possessed of pores. Thus there is a threefold possibility of perceiving sounds.

Graber's investigations were made on the youngest, living larvæ, with a high microscopic power, and concern first the structure, then the distribution, and lastly the morphology of the different chordotonal organs. These fibres are small conical bodies, pointed on their proximal and blunted on their distal ends, and hollow within. They are composed of a homogeneous, highly refractive bluish substance, very tough and elastic, and adherent to the chitinous cuticle. The shape of the head varies greatly in different insects, some being pear-shaped, others cylindrical ; and it is traversed throughout its entire length by a canal containing a granular mass which is probably connected with the chorda. This is probably the axis-cylinder, which originates in the ganglionic cells.

The scolopophora are tubular terminations of the chordotonal nerves, which surround the fibres, and passing over their club-shaped ends terminate in a tube which is attached to the integument. This tube, besides a granular mass, contains spindle-shaped nucleated corpuscles. They vary in length, the longest being five times as great as the shortest.

The scolopophora are rarely monoscolopic, but generally polyscolopic, and the greatest number are found in the tympanal and poriferous structures. The number of fasciculi on the tympanal organs of the acridia was more than one hundred, while those on the poriferous organs were often more than two hundred.

When the cords, as may happen, instead of running straight along are curved at right angles, we find a new structure, the so-called chordotonal ligament. This arises from the apex of the angle of curvature, and represents a prolongation of the afferent branch: thus T, and the scolopophorous cord is kept tense in spite of the angular curvature.

The chordotonal organs are always situated between two immovable points of the integument. Moreover, the filaments are always limited to a segment of the trunk and limbs, and never cross the intervening spaces.

Graber has found these organs not only in the orthoptera, coleoptera, and diptera, but also in the pseudoneuroptera, neuroptera, lepidoptera, and in the rhynchota.

With the exception of the mandibles, maxillæ and anterior wings, the membranal chordotonal organs are found in all parts of the head and trunk.

In the physiological part, Graber discusses the question, whether insects respond to sound-waves or not. His experience leads him to a positive conclusion with regard to insects which live in water and such as live in the air. As soon as they were exposed to noises they endeavored to escape, particularly if the tones were of a high pitch.

The assertion that the movements of insects after exposure to sounds are only reflex is disproved by the fact that they become gradually accustomed to them, and always react less and less; and again, in musical grasshoppers their sounds attract those of the opposite sex.

In respect to the question, whether there is really hearing or only a kind of touch or feeling, Graber says, that the differentiation of the entire system of special sense would be of little

value if it were not accompanied with the ability to distinguish between different sensations. As insects are undoubtedly able to distinguish differences in pitch, it is very probable that this is accomplished by the sense of hearing, and not that of touch. He has proven that insects possess several organs of hearing, by destroying the tympanal organs in crickets without impairing their ability to perceive sounds.

As far as the function of the poriferous and primitive chordotonal organs is concerned, Graber believes that these are also of an acoustic nature.

By experimenting on decapitated insects he has found that the central organ of hearing is not located in the head alone, but may also be found in the abdominal cavity. The extra-cephalic situation of the chordotonal organ cannot be taken as an evidence that it is not an organ of hearing.

9. HANNOVER has studied the development of the human skull on 25 embryos varying from two to eight months. His results are as follow: The occipital, temporal, sphenoid, and ethmoid bones, the inferior turbinated bones, and ossicula auditûs, are developed from the primordial cartilage. The process of ossification does not take place by the metamorphosis of the cartilage cells, but by means of the periosteum. All of the ossicula auditûs are developed as a continuous cartilaginous mass from the walls of the labyrinth. As far as their ossification is concerned, his view is in direct opposition to that generally entertained.

II.—PHYSIOLOGY OF THE ORGAN OF HEARING AND PHYSIOLOGICAL ACOUSTICS.

BY OSCAR WOLF, OF FRANKFORT-ON-THE-MAIN.

Translated by WILLIAM C. AYRES, M.D., New York.

1. Dr. J. KESSEL. (*a*) On the function of the auricle in the perception of space. (*b*) On the difference of the intensity of a linear-excited sound in different directions. (*c*) On the hearing of tones and noises. *Archiv f. Ohrenh.*, vol. xviii, H. 3, pp. 120–151.

2. Dr. HESSLER. Contribution to the physiology of the ear. *Ibidem*, vol. xviii, H. 4, p. 227–272.

3. W. KIESELBACH. On the function of the semicircular canals. *Ibid.*, vol. xviii, H. 3, p. 152–156.

4. Dr. J. BARATOUX. Élève du laboratoire des hautes-études et du laboratoire de physiologie de la faculté de médecine de Paris: Pathogénie des affections de l' oreille, éclairée par l' étude expérimentale. Paris, chez Adrien Delahaye et E. Lecrosnier, 1881, 118 pag.

5. Dr. V. URBANTSCHITSCH. On subjective variations in the intensity of acoustic perceptions. *Pflüger's Archiv*, vol. xvii, pp. 436–453.

6. Dr. W. KIRCHNER. Contribution to the knowledge of the circulation and secretion in the tympanic cavity.

7. Dr. W. KIRCHNER. On the influence of the trigeminus on the ear.

8. W. BECHTEREN. The importance of the infundibular region of the third ventricle in the maintenance of the equilibrium of the body. Preliminary contribution from the clinic of Prof. Mierszejewski (after a communication made at the meeting of the Psychiatrical Society, in which the animals operated on, and the preparations of the brains, on which the operations had been previously performed, were exhibited). *Petersburger med. Wochenschr.*, No. 12, 1882. (Reviewed by H. Steinbrügge.)

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1. (*a*) *On the function of the auricle in the perception of space.*

Contrary to the opinion of Hensen,[1] that the auricle has but little influence on hearing, KESSEL has examined its function and come to the conclusion that it is of importance, especially in determining the perception of space. He further points out that the ear is capable of appreciating the smallest variations in the intensity of sound, and still the sound will be referred to the side of the stronger excited ear, if both ears are excited at the same time. In order to determine what part the auricle plays in the determination of the direction of sound, Kessel uses various instruments (large tuning-forks, the watch, and steam-inhalation apparatus). If one ear is closed, and the instrument held in front of the open ear, and first moved forward and then backward in the direction of the median axis of the skull, and then in the direction of the axis of the external canal, in each case carying it so far that the tone can just be heard, it is found that the distance from the ear is greater in the first direction than in the second, and greatest of all in the third. Therefore the

[1] "Manual of Physiology," Herrmann, vol. ii, p. 24.

sound is heard better in the direction of the axis of the external canal. If the auricle is pressed against the head, the distance at which the same sound is heard will increase behind and decrease in front. If the hollow of the hand be placed against the auricle, the above relation is reversed. In both conditions the hearing-distance remains the same in the direction of the axis of the canal. (These facts were known before. See Politzer's "Manual of Otology," pag. 65.—Reviewer.) Kessel then determines five auditory regions by his experiments, which are characterized by the fact that, when the head is kept still, a sound reaches the ear in different intensities, or, when the head is moved, produces different grades in the change of intensity. The anterior auditory region extends from the median axis to the tragus; the middle or direct, from the edge of the tragus to the posterior edge of the auricle; the posterior, from the last-mentioned locality to the prolongation of the median axis backward. The inferior extends from the downward prolongation of the vertical axis of the skull up to the lower wall of the external canal; the superior, from the upper wall of the canal up to the vertical axis. The certainty in the *perception of space* depends, however, on the combined action of the eye and ear, and on the motions of the head and body in directing them toward the source of sound. For the proper understanding of these experiments, the reviewer thinks it necessary to study the elevations and depressions of the auricle, according to mathematical and physical laws as to the reflection of sound-waves, since they probably would form essential boundaries to the above auditory regions.

(*b*) *On the difference in intensity of a linear-excited sound in different directions.*

In these experiments the author treats of a phenomenon of bone-conduction which was first called attention to by Lucae. If a tuning-fork be placed laterally on a parietal bone, and both ears stopped up, it is heard almost alone by the opposite ear. Later observations by Tröltsch and Urbantschitsch confirm this, and also state that if the ears are left open, the perception is sometimes on the opposite side. Kessel also states that if the tuning-fork is placed perpendicular on one half of the (upper?—Rev.) maxillary bone it is heard, not in the ear of the same side, but in that of the opposite side. He then reports the results of a series of ingenious experiments to determine a physical cause for this phenomenon. He comes to the conclusion that the tone of a tuning-

fork is heard much better in the direction of the prolongation of the handle than in a direction perpendicular to this. He then goes into the transmission of such a sound in gas, water, wood, and animal tissues.[1]

For the power of transmission of the various tissues of the skull the following order was established: bone, connective tissue, muscular, glandular, and brain. Accordingly, brain tissue is the worst conductor, and could, therefore, have but little influence in the above phenomenon. If the skull was freed from its brain contents, and the tuning-fork placed on the glabella, its tone was stronger than when placed on the temple.

(*c*) *On the hearing of tones and noises.*

On account of the experiments of Helmholtz on the analysis of sounds, the physical properties of noises and the physiological processes in their perception have been neglected. Kessel remarks that this neglect is particularly conspicuous in the analysis of subjective sensations in diseases of the ear. After a series of experiments he comes to the conclusion that in the perception of noises the same conditions are present as in that of tones. The pitch of a noise can also be determined. For instance, if we gently blow small whistles with movable pistons, a noise is produced which has a recognizable pitch, changing with the movements of the piston. If we blow harder, a tone will be produced whose pitch will almost correspond to that of the noise, so that from the pitch of the noise we can know what the tone will be beforehand.[2]

Kessel then states further, that if noises are produced together with tones, they can both be perceived by the ear at the same time. By so adjusting their strengths, the two kinds of sounds can

[1] For this purpose an electro-magnetic tuning-fork was used, on whose handle a small cylindrical wooden rod was attached. A second rod of the same size communicated with one tube of a triple otoscope. If both tubes are placed in the ears, and a piece of animal tissue of the same thickness as that of the two fir rods inserted between these rods, so that a direct communication be made between the electro-magnetic tuning-fork and the ears of the observer, the intensity of transmission in the communicating piece can be determined.

[2] Reviewer would here remark, that already in 1871, when determining the pitch of the consonants, he substantiated the opinion that the so-called noises which, among others, impart also their characteristics to several consonants, may be defined as a simultaneous sounding of a number of very high tones, which are close together in the musical scale, but in inharmonious relation to one another.

A fundamental tone, which governs the pitch of noises, can be determined partly by resonators and partly by the ear alone. On this principle the reviewer constructed his scale of pitch for the human voice. See "Speech and Ear," p. 70.

be so arranged that they are heard simultaneously. If this relation be then changed, the two sounds so influence each other that the stronger overcomes or does away with the weaker. There is, however, a remarkable condition, that the three lower octaves, from C^{-3} to c^{0}, are relatively much easier destroyed than the higher ones. The reviewer cannot agree with the author in the explanation of this observation. The lower tones are not destroyed when they are produced with a large apparatus. In determining the lower tone-limit, Preyer uses two large tuning-forks: one, 1 metre; the other, 0.7 *m.* in length, placed on resonators.[1]

Kessel then discusses the hearing of tones and noises under changes of pressure in the external canal. He finds that an increase of pressure by 10 *mm.* of mercury causes a reduction of the whole range of audition, which is most marked at its lower limit.

Tuning-forks of 32–64 vibrations are quenched, and one of 128 is still more influenced. Very high tones of 12,000–16,000 are not perceived under this pressure, while those between are not abolished. In a diminution of pressure in the external canal of 10 *mm.*, the tones from the lowest limit up to c^{4} are less intense, whereas those from this up to the highest limit of hearing are very much more intense. All noises are also diminished by diminution of pressure as above. (Probably from the reason that they are made up of very high unharmonic over-tones.—Reviewer.)

Kessel then goes into the observation of the vibration of the different quadrants of the drum membrane under increased and diminished pressure and their response to tones, and comes to the conclusion that the different parts of this membrane, as the radial fibres, must have an independent relation to sound, in so far that the shortest fibres in the superior part of the anterior segment and in its upper division vibrate with the highest tones, and the longest fibres of the posterior segment with the lowest tones (? Rev.); that noises are received by the upper part of the posterior segment and the third sector. There must also be a place in the posterior segment where the lowest tones and noises greatly interfere with each other.

[1] In order to show that very deep tones, produced in sufficient volume, are not destroyed by high and loud noises, we need only observe large locomotive engines. The deep tones which they produce when they put into vibration the large resonating chamber of the tender are so powerful, that they are not only not overcome by the noise of the rest of the machinery, but produce upon the ear a very uncomfortable sensation. On the other hand, it has often been pointed out that the ear is especially sensitive for the higher and highest tones of the scale.

He explains in this way the fact that in increased pressure the higher tones are relatively but little influenced, since the higher tones are by far more easily conducted by the bones of the head *than the lower*.[1] In this way the influence which the drum-membrane exerts will be less perceptible.

2. HESSLER in his present paper very felicitously discusses many physiological questions as to the conduction of sound. First of all he endeavors to clear up the difference between Hensen[2] and Rinne.[3] Hessler confirms Rinne's observation, that the conduction of tones through the bones of the skull, which are produced by vibrations of a solid body placed on the skull, is inferior to the natural conduction through the air, drum-membrane, etc., and then presents a series of experiments to determine the relative length of time a tone can be heard from different points of the bones of the head. He confirms the observation, that the higher the tone so much the more is the bone-conduction of it inferior to that of air.[4]

The tone c^0 is heard 13–15 seconds longer by air-conduction than by the teeth; and when the base of the tuning-fork is held directly at the canal it is heard 23–25 seconds longer: the tone c^1 is heard 65–67 seconds longer by air-conduction than by the teeth; the tone c^2 55–60 seconds longer; c^3 33–35 seconds longer. It is here to be remembered that when struck equally the lengths of vibration of the forks c^1 and c^2 are almost equal, while those of c^0 and c^3 are about $\frac{1}{3}$ as long as c^1 and c^2.

As to the sound-conduction of other parts of the skull, the tone c^0 is heard 12–13 seconds longer through the teeth than from the vertex; and c^1, 30–35 seconds longer.

[1] Kessel speaks more extensively on the direct bone-conduction and on the so-called indirect cranio-tympanic or air-conduction, in another place. When he says that in closure of the external canal the tones of tuning-forks from C^{-2} to c^0 are not conveyed to the labyrinth by air conduction, while those of over 4,000 vibrations are heard much easier, he stands in direct opposition to Hessler. See this page No. 2. The difference in the opinions of the two authors probably results from the fact that Kessel speaks of the bone-conduction of sounds by closed canals, while the sound of a tuning-fork which vibrates close to the ear, is carried to the drum-membrane by the auricle, and this cannot be considered as bone-conduction. Even when the external canal is closed there always remains a certain quantity of air before the drum-membrane, which could impart vibrations to the drum-head, which it (the air) had received from the cartilage of the canal.

[2] "Physiologie von Herrmann," vol. iii, 2, p. 26.

[3] *Prager Vierteljahrschrift*, vol. i, 1855, p. 72.

[4] That this opinion is antagonistic to that of Kessel has already been observed.

Hessler further confirms the opinion of Urbantschitsch, that variations are perceived in sounds of the lowest intensity, and that the respiration and pulse movements have not the least influence on this phenomenon of hearing.

Finally, Hessler discusses the doctrine of Helmholtz in his "mechanism of the ossicles," and the origin of the so-called clattering or jarring sounds (Klirrtöne). According to the latter author, this clattering is produced by the ratchets of the hammer-anvil joint. Politzer considers it as coming from the membranes and ligaments of the ossicles. Hessler then relates experiments to show that it owes its origin to the difference in the amplitude of vibration between the two prongs of the tuning-fork. That prong which is struck with the percussion-hammer must at first make greater vibrations than the other. It is after this difference has been corrected that the clattering disappears, and the true tone comes out. The interesting proof of this must be read in the original. The reviewer will here remark that Hessler and others have observed, that patients who have a hammer-anvil defect, and in whom there can be no possible striking together of the ratchets of the hammer-anvil joint, still hear the clattering.

3. KIESELBACH cut the semicircular canals in two large carps, in order to see if these fishes showed any disturbance of equilibrium. Only one of them made a rotation around the long axis of his body. K. thought that this was caused by a loss of blood from the operation.

4. BARATOUX'S little work recommends itself so much the more to our notice as it contains all the recent German literature, a fact which, we are sorry to say, is rare with French authors. Even when the author's discussion of certain observations—which he declares as physiological facts—is but little beyond the limits of hypothesis, we, however, recognize that his work has a solid foundation. His vivid and attractive style, too, makes a pleasant impression. As he says in the introduction, experiments on animals should hold the most important place in studying the pathological conditions of the ear, creating, as it were, an experimental pathology of the ear,—an idea which should be well received from a physiological stand-point. The author has many excellent experimental physiologists among his countrymen, and he seems to have well employed their methods. The names of Magendie, Flourens, Béclard, Longet, Cl. Bernard, Vulpian, Mathias Duval, Ranvier, etc., appear often. The first part of the

work is devoted to the most recent literature of the anatomy and development of the ear, and a chapter on the physiological study of the function of the inner ear closes the anatomical part.

The *second part* is devoted to experimental study of lesions of certain nerves, whereby we can observe their effects on the middle and inner ears. The experiments are more particularly on the sympathetic, trigeminus, and the medulla oblongata. In the *third part* he compares certain morbid processes which seem to be in harmony with the physiological facts brought out in the second part, but states that he has not the pretension of having done justice to this extensive and intricate subject.

First chapter : Anatomy, morphology, embryology. The second chapter of the first part is entitled, " Physiologie appliquée à l' oreille interne," and principally treats of the function of the semicircular canals, and the organ of Corti (membrana basilaris). After criticising the extensive literature on the so-called *sense of space* which was called forth by the publications of Flourens, Baratoux comes to the conclusion that the two branches of the acoustic nerve (ramus cochleæ and r. vestibuli) have entirely different physiological functions : the first he calls the "nerf auditif " ; and the second, " nerf de l' espace." The semicircular canals are the peripheric organs for the equilibrium of the body, with the centre in the cerebellum. As a proof of this he cites the experiments of Gellé. Gellé perforated both cochleæ in a guinea-pig, which resulted in absolute deafness of the animal, but did not affect his equilibrium. He also cites the case of persons born deaf but who never experience any disturbance of equilibrium. On *post-mortem* examinations these people do not show pathological conditions in the semicircular canals, but the cochleæ exhibit very extensive ones, especially atrophy of the nerve fibres, and irregularities in the teeth of the first row. (The drawing seems to be very schematic and does not carry conviction with it.—Rev.) Baratoux does not give any thing new on the theory of co-vibration and the analysis of sound by the organ of Corti, but reports on what has been done by Helmholtz, Hasse, Hensen, Jendrassik, and others.

The first chapter of the second part is entitled : " Étude expérimentale de l' influence des lésions des nerfs grand sympathique et trijumeau, et du bulbe rachidien sur la determination de certains affections de l' oreille."

Section or irritation of the superior cervical ganglia of the sym-

pathetic causes a narrowing of the pupil, and a sinking of the eye-ball into the orbit, an increase in the blood circulation, and a rise of temperature on the corresponding side; while an electric excitation of the upper end of the cut cervical ganglia causes a dilatation of the pupil, and retardation of the blood circulation, and a paleness of the organs before very red, and also a fall of temperature.

In order to show the effect of such a section on the middle ear, B. performs the section on rabbits according to Cl. Bernard. The narrowing of the pupil, dilatation of blood-vessels, and elevation of temperature on the wounded side lasts a long time, but B. could not notice the hypertrophy of the auricle as described by *Bidder*. In other animals which were killed after some days, B. found *great congestion of the lining of the middle ear* with dilatation of the blood-vessels, which could also be easily observed in the semi-circular canals. In animals which had lived for several weeks after the operation, he found an exaggeration of these symptoms even to a pronounced inflammation with pus formation and a hypertrophic condition of the lining of the tympanic cavity. Some of the animals lived five years after being operated on. The accompanying drawings of the middle-ear changes are very clear and convincing. He concludes that inflammation in the middle ear develops much slower after section of the cervical ganglia of the sympathetic, than after section of the trigeminus. By cutting the trigeminus inside of the skull, he was able to substantiate Gellé's results,[1] which were opposed by Hagen: He shows that much greater changes (such as suppuration and destruction of the parts of the tympanic apparatus) occur in the middle ear than after wounds of the sympathetic, and believes the cause of it is, that the trigeminus sends more vasomotor or trophic fibres to the ear than the sympathetic. On this account there is a much greater disturbance to the nutrition of the tympanic cavity after section of this nerve, than after division of the sympathetic.

Finally, he considers that there is a vasomotor centre in the medulla, which is located between the nuclei of the ascending roots of the trigeminus and the first cervical pair. (For this belief he does not furnish sufficient proof.—Rev.)

When this part of the cord is wounded, a dilatation of blood-

[1] Compare the reviews in these ARCHIVES. Baratoux believes that the difference between these two authors comes from the fact that the animals operated on by Hagen did not live long enough after the operation in order to allow the changes in the middle ear to develop.

vessels rapidly takes place on the same side. In some cases Baratoux found hemorrhages in the cochlea, and suppurative otitis media.

5. As a continuation of his experiments on the increase and decrease of acoustic perceptions,[1] URBANTSCHITSCH furnishes observations on "subjective changes in the intensity of acoustic sensations." They were made on persons who were hard of hearing, and compared with the same observations on the normal ear. The tones of the forks *C*, *D* sharp, *c*, *d* sharp were conveyed to both ears simultaneously by means of a three-limbed tube. U. determines that the variation in the hearing of a sound of small intensity, which he had explained before as a phenomenon of fatigue, is not entirely due to the tiring of the ear, but is in part a peculiarity of the acoustic sense. In the beginning of the experiment, with very weak sounds, this phenomenon is present, and therefore cannot result from aural fatigue. In physiological variations of hearing he also finds that sometimes in the middle of a hearing test, there is a very strong subjective sound-sensation, which was not heard in the beginning. Especially in people who hear badly, it may happen that in the beginning they may not hear the tone of a certain tuning-fork, even when struck hard; whereas, after a repetition of the experiment, the same tone may be distinctly heard, even when not struck hard. Accordingly, it seems that the ear increases in sensibility after repeated irritations, so that a momentary irritation which was not heard may be perceived after frequent repetitions of the sound. It also happens that the tones of tuning-forks (for instance, high ones) are heard after repeated irritation, whereas they were not heard before. U. could also show similar changes of sensibility in other organs of special sense.

6. & 7. KIRCHNER gives a complete representation of the experiments which were briefly communicated in the *Monatsschrift f. Ohrenheilk.* Kirchner's method of opening the bulla ossea, exposing and cutting the third branch of the trigeminus just after its exit from the skull into the anterior part of the tympanic cavity, has the advantage over other methods (cutting the trigeminus in front of the gang. Gasseri in the interior), that it makes a relatively less trauma (chloroform and curari not used) and furnishes a better view of the middle ear. After an electric irritation of the

[1] Compare the review in these ARCHIVES.

upper end of the cut nerve,[1] he saw a great dilatation of the blood-vessels producing a livid hue, and a greatly increased secretion of mucus in the tympanic cavity. For the explanation of these phenomena he considers many possible causes. There is either a greater irritation of the secretory nerve fibres of the mucous membrane by way of a reflex action, or the electric irritation passes along the third branch, and causes dilatation and increased secretion through the gang. otic by increasing the quantity of blood in the parts. The otic ganglion and the third branch of the trigeminus would then have the same relation to the mucous membrane of the tympanic cavity as the spheno-palatine ganglion and the second branch have to the mucous membrane of the nose. Kirchner does not seem to have read Baratoux's work while he was making his experiments, and it is so much the more interesting, since the two authors have arrived at the same results independent of each other. We thereby gain more trustworthy knowledge of the action of the two important groups of nerves on the ear,—the sympathetic and trigeminus. It is fair to conclude that from this method of experimentation we will also gain definite knowledge of the exact nature of a series of ear-affections which we have heretofore designated "nervous defective hearing, sclerosis, etc."

8. BECHTEREN has observed that in operations on dogs which he had done before, after wounds of the inner parts of the upper rounded portion of the substantia nigra of the crura cerebri, between the pons and the ganglia of the cerebrum, continuous rotary motions moving the long axis of the body take place toward the non-wounded side. Besides these rotations of the head and body, also a deviation of the eyes in such a manner, that one eye with a dilated pupil appeared deviated upward and outward, and the other with a contracted pupil, downward and inward. Similar symptoms occurred after wounds in the infundibular region of the third ventricle (see original). Bechteren therefore thinks that those parts stand in communication with the centre of equilibrium in the cerebellum, like the terminal nerve-apparatus in the ampullæ, by nerve-tracts which run to the crus cerebelli. This takes place by fibres which decussate, while the ampullar nerves pass upward to the crus cerebelli in a straight course. He thinks it further possible that sensations can be produced by the motions

[1] Kirchner chooses the third branch from practical reasons, because its area of distribution is in the nasal cavities, and because its section has far less influence than that of the first and second branches.

of the fluids in this region, which can lead to the estimation of the position of the head, giving a second organ for the sense of space, which could act vicariously with the labyrinth in case of a destruction of the latter apparatus.

III.—PATHOLOGY AND THERAPEUTICS OF THE EAR.

By A. HARTMANN, Berlin.

(Translated by William C. Ayres, M.D., New York.)

GENERAL.

1. Dr. Christinneck. Statistical report on the cases examined and treated in the clinic in Halle, from Oct. 15, 1880 to Oct. 15, 1881. *Arch. f. Ohr.*, vol. xviii, p. 284.

2. Dr. Bürkner. Report of cases treated in clinic at Göttingen. *Ibid.*, p. 297.

3. J. J. Kirk Duncanson. Report of cases treated in the Edinburgh Ear Dispensary. 1882.

4. Thomas Barr. Special report of 1,088 ear-patients treated at the Glasgow Western Infirmary, from Nov. 6, 1877 to May 28, 1881, with remarks. *The Glasgow Med. Journ.*, Feb., 1882.

5. C. R. Agnew and David Webster. Clinical contributions to otology. These Archives, vol. x, p. 335.

6. R. Schalle, Hamburg. On the treatment of diseases of the ear and nasal cavities. A posthumous paper. With a short preface by S. Moos, of Heidelberg. These Archives, vol. xi, p. 113.

7. Samuel Sexton. Cases of deafness in school-children. Washington Circulars of Information, No. 5, 1881. See Dr. Burnett's report.

8. Dr. Hedinger, Stuttgart. On the ear-diseases of engine-drivers. *Deutsche med. Wochenschr.*, No. 5, 1882.

9. S. Moos, Heidelberg. Railroad accidents which could have been caused by defective hearing of the engine-driver or fireman. These Archives, vol. xi, p. 91.

10. J. Baratoux. Pathogenesis of the affections of the ear. Paris.

11. J. Baratoux. The relations between ear-affections and uterine diseases. Paris, 1880.

12. P. McBRIDE. Diseases which involve the ear. *Edinb. Med. Journ.*, Feb. and March, 1882.

13. E. WEIL, Stuttgart. The results of an examination of the ears of 5,905 school-children. These ARCHIVES, vol. xi, p. 33.

14. E. WEIL, Stuttgart. Is there a continuous physiological noise in the ears? *Monatsbl. f. O.*, No. 2, 1882.

15. Dr. K. BÜRKNER. On the importance of Leiter's temp. regulator in the treatment of ear-diseases. *Archiv f. Ohrenheilk.*, vol. xviii, p. 115.

16. Dr. CZARDA. A fixation apparatus for aural and nasal specula and catheters. *Prag. Wien. med. Presse*, No. 2, 1882.

17. Dr. GRAZZI, Firenze. Del bagno a vapore naturale, etc. *Giornale internaz. delle scienze med.*, Anno, iii.

18. Dr. J. MICHAEL, Hamburg. Psychrophore. A new illuminating apparatus without heat. *Illust. Viertelj. f. ärztl. Polytechnik*, vol. iii, 1882.

18 *a*. SCHRAUTH. Communication from the Munich Garnisons-Lazareth. Report of the ear department, with remarks on the forensic importance of ear-diseases. *Bayer ärztl. Intelligenzblatt*, Nos. 16 and 18, 1882.

18 *b*. HEDINGER. The new method of treating middle-ear diseases. *Würtembergisches Correspondenzbl.*, No. 7, 1882.

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1. CHRISTINNECK'S statistical report of Schwartze's clinic includes 494 cases which were treated in 1880–81. The operations are tabulated. In 50 cases of paracentesis there were only 16 with subsequent inflammation and suppuration. Several histories of cases are given, two of which are of syphilitic disease of the external canal; one of exfoliation of a necrotic cochlea, where the tuning-fork was heard better on the affected side.

2. BÜRKNER treated 516 patients in 1881. He makes some remarks on the treatment of otitis media suppurativa with iodoform. He observed but little effect from the remedy. He also observed a case of varioloid in the external canal, and one of fracture of the walls of the canal.

3. KIRK DUNKANSON'S report covers 500 cases. He makes a few remarks on the removal of foreign bodies from the canal and on the instruction of aurists.

4. THOMAS BARR treated 1,088 cases during the time stated.

8. HEDINGER reports on the examination of 148 engine-drivers and firemen. He used an improved (?) Politzer's hammer with a normal hearing distance of five metres; also a large *A* tuning-fork of König. His results are given in four tables. He also comes to the conclusion, that a diminution of hearing results from the occupation of these people. The number of those who have defective hearing increases with the length of time they have pursued this occupation. The objective conditions were almost always those of the sclerotic form of middle-ear catarrh. Naso-pharyngeal affections were very frequent. Subjective noises were seldom complained of. Hedinger agrees with Schwabach and Pollnow.

10. The clinical part of BARATOUX's monograph is a meritorious presentation of the affections of the ear which are brought about by nervous disturbances. He tries to bring such affections into accord with his physiological knowledge. The description is based on experiments which are partially his own, partially collected from aural literature. In the first chapter he treats of those ear-diseases which depend upon some abnormality of the sympahetic; and in the second, of those which depend in the same way upon the trigeminus; and in the third, those which come from the cord. We may conclude from his book: That all febrile diseases which are attended by increased blood circulation cause changes in the ear, as congestion, suppuration, hemorrhage, and noises—hardness of hearing. All lesions of the trigeminus before its exit from the skull can produce defective nutrition in the ear. It is probable that disturbances in the vaso-motor centre can bring about ear-disease, but the experiments in this direction are not conclusive. It is, however, probable, that spontaneous hemorrhage is the result of some disturbance of the cerebral-axis, as many cases of Ménière's vertigo depend upon hemorrhage in the inner ear.

11. After an introduction in which BARATOUX treats of the connection between the diseases of the sexual organs and those of the ear, or between ear and uterus, he describes those ear-diseases which occur at puberty. The advent of this period can cause an improvement or an aggravation of old ear-affections, and it may also be that one ear, having remained healthy up to that time, may then become diseased. The diseases which are observed during menstruation are distinguished by noises, which are loudest 2–3 days before the hemorrhage, and diminish toward the end of the period. Besides these, all other ear-diseases may be influenced.

He reports seven cases in which such a relation could be demonstrated. In the fifth chapter Baratoux treats of ear-diseases which occur during pregnancy. Here also an old condition may become worse, or an entirely new one set in.

Finally, he cites a case where an ear-disease caused a uterine trouble to appear. The case was one of otitis media with polypi, which had existed for five years. The secretion increased during menstruation (age 28). When the polypi were removed there was a simultaneous hemorrhage from the ear and the vagina, notwithstanding the fact that the patient had menstruated only thirteen days before. In the after-treatment, every time the ear was treated, vaginal hemorrhage occurred. Her menstruation returned one month after the operation, and went on regularly from this time.

12. McBride gives a compilation of the literature on the secondary ear-diseases which occur after acute febrile diseases (as measles, scarlet-fever, chicken-pox, typhus, etc.), and after other general diseases (gout, rheumatism, syphilis, tuberculosis, leukæmia, Bright's disease, etc.).

14. Weil has a continuous seething noise in both of his ears, like that of a gas flame, and opens the question whether there is a continuous physiological noise in the ear.

15. Leiter's heat regulator, which is recommended by Bürkner, consists in a spiral lead tube, through which water of any temperature can be passed. The tube can be made into any required form. Cold water showed itself to be useful in a case of otitis externa diffusa, in two cases of otalgia, in otitis media acuta, and especially in periostitis of the mastoid. The warmed lead tube worked well in furuncles, and in a case of a large abscess of the auricle.

16. Czarda describes a fixation apparatus according to the principle of the stopcock by compression, which can be attached to the forehead band, or to the steel spring which he has recommended before. The speculum or the catheter is held between its two branches.

17. The grotto of Monsummano is said to be beneficial for deafness. Grazzi has visited the place, and describes it. It consists in a cave 260 metres long, with warm atmosphere of a temperature of 30–33° C. In connection with this there is an institute attended by two physicians. The grotto is used as a steam bath, the length of using it being generally one hour.

Grazzi thinks that catarrhal ear-affections of short duration can be treated there with benefit.

18. The apparatus which MICHAEL describes as a psychrophore, for the purpose of illuminating the cavities of the body with cold light, is made by using a phosphorescent substance, and gives a relatively bright light. The substance is enclosed in a glass bulb, into which two electrodes enter. The globe is fastened to a handle, and is connected by two copper wires to a Rumkorff's inductor. A condenser and switch are attached. The intensity of the light is about 0,01 of a candle, but since it can be brought close to the part to be inspected, a double brightness can be obtained.

18 *a*. Of the 330 cases treated at the military clinic in Munich, the great majority were affections of the middle ear, and most of these due to catarrh. SCHRAUTH explains the frequency of ear-disease in the troops, by the small amount of pathological change that they exhibit, and the surgeons confining their attention simply to the subjective symptoms in such cases. After giving the complete histories of seven cases, he discusses the forensic importance of ear-diseases, and especially traumata, and their relations to consecutive complications of the brain, carotis, jugularis, and sin. transversus.

18 *b*. HEDINGER recommends boracic acid, since it acts as an antiseptic. Only in cases where there are already large granulations, and in chronic muco-purulent catarrh he does not use it.

In granulations he uses salicylic acid ; in larger ones he uses caustics, preferring a ten-per-cent. solution of salicylic acid in alcohol. Chloride of zinc is energetic but painful ; chromic acid (in crystals) deliquesces too much. He considers galvano-caustic the safest and cleanest agent.

In large granulations he uses pure alcohol ; in suppuration without granulations, idoform and sometimes resorcin. In cases of suppuration and complication of the mastoid he prefers the conservative to the operative method.

EXTERNAL EAR.

19. LAURENCE TURNBULL. Acute inflammation of the auricle. *The Med. Bulletin*, No. 4, 1882.

20. H. KNAPP, New York. Congenital fibrous closure of the external canal. The opening frustrated by hæmophilia. These ARCHIVES, vol. xi, p. 19.

21. B. LÖWENBERG, Paris. Le furoncle de l' oreille et la furonculose. Delahaye and Lecrusnier, 1881.

22. THOMAS BARR. Furuncular or circumscript inflammation of the external meatus. *Glasgow Med. Journal*, March, 1882.

23. Dr. WETTE, Cologne. A case of acute desquamative inflammation of the drum-membrane. *Monatsch. f. Ohrenheilk.*, No. 2, 1882.

24. F. GRAF, Frankfort. On the artificial drum-membrane, especially the cotton pellet. These ARCHIVES, vol. xi, p. 109.

25. CHARLES ORR, New York. Occlusion of the external meatus. *American Journ. of Otology*, vol. iv, p. 45.

26. TAGE HANSEN, Aarkus. Exostosis of external meatus, etc. *Hospitals-Tidende*, vol. ix, No. 3.

27. S. C. AYRES, Cincinnati. Exostosis of the external canal. These ARCHIVES, vol. x, p. 327.

28. SWAN M. BURNETT, Washington. Otomyces purpureus in the human ear. These ARCHIVES, vol. x, p. 319.

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19. TURNBULL describes four cases of acute inflammation of the auricle. The treatment of the first stage was antiphlogistic, with compresses. If fluid has been secreted an opening must be made for drainage. The after-treatment consisted in painting with iodine and the use of compresses. Treated in this way, the resulting malformation of the auricle was only slight.

21. This very exhaustive paper of LÖWENBERG on furuncles and their formation (46 pages) contains much which was said by the author on the subject at the congress at Milan. Contrary to Pasteur (who thinks that furuncles result from a precipitation of micrococci from the blood), Löwenberg believes that when a furuncle has been once formed by an accidental accumulation of specific micrococci in a gland follicle, a relapse and extension are brought about by propagation of the microbes on the surface to other follicles, thus producing new furuncles by auto-contagion. Only the worst cases of furuncles must be explained by micrococci circulating in the blood. The relation of diabetes mellitus to the formation of furuncles, he explains by the fact, that sugar is conducive to the formation of micrococci, notwithstanding the fact that sugar water is not very productive of micrococci. His communications on the contagiousness of furuncles are worthy of note.

In conformity with his ideas as to the pathogenesis of furuncles, he discards the use of salves and heat in their treatment. He considers boracic acid in aqueous or alcoholic solutions the best treatment. Lukewarm instillations are also made after incision. He recommends this since the nests of micrococci are thereby laid bare, and the remedy then comes in direct contact with them. Boracic acid also prevents auto-contagion. In conclusion, he calls attention to the frequent occurrence of furuncles in all armies. Where scrupulous cleansing is not possible Löwenberg recommends the powdering of the opened furuncles with boracic acid morning and evening.

22. BARR gives the most recent ideas on circumscribed inflammation of the outer ear. As a preventive he recommends: The external canal must be kept dry in otorrhœa, and eczematous inflammations done away with. Early incision is better than cautery in the first stages. If an operation is refused, moist warm applications are to be made. Besides this, general treatment is important.

23. WETTE describes a case of a recurring epidermoid membrane on the drum-head, in a patient who had had otorrhœa.

25. ORR describes three cases of closure of the external canal from Sexton's clinic. See Dr. Burnett's report.

26. HANSEN reports a case of mamillary exostosis in the right ear of a 26-year-old man. The tumor had its origin in the anterior wall and almost closed the whole canal. The patient did not have scrofula or syphilis. The operation was done with a drill and a forceps. Resulted in cure. (Rev. by v. BREMER.)

MIDDLE EAR.

29. CLARENCE J. BLAKE, Boston. Acute congestion of the upper part of the tympanic cavity and the drum-membrane. *Am. Journ. of Otol.*, vol. iv, p. 102. See Dr. Burnett's report.

30. EUGENE HOLT, Portland. Acute inflammation of the middle ear. *Ibid.*, vol iv, p. 106. See Dr. Burnett's report.

31. S. MOOS, Heidelberg. On a case of pyæmia in the course, and after the healing, of an acute suppurative otitis media. *Zeitsch. f. Ohr.*, vol. vi, p. 238. (To appear in our next number.)

32. Dr. A. EITELBERG, Wien. On the treatment of chronic otorrhœa. *Wiener med. Presse*, 1882.

33. Dr. J. MICHAEL, Hamburg. A fluid artificial drum-head, and a new method of treating chronic otorrhœa. *Berl. klin. Wochenschr.*, No. 8, 1882.

34. Dr. MOURE. Une perle enkystée dans l'oreille. *Revue mensuelle de laryngologie*, etc., No. 6, 1881.[1]

35. CHAS. H. BURNETT. Salicylate of quinine for otorrhœa. *Am. Journ. of Otol.*, vol. iv, p. 122. See Dr. Burnett's report.

36. ALBERT H. BUCK. The value of counter-irritation in certain ear-affections. *Ibid.*, vol. iv, p. 166. See Dr. Burnett's report.

37. THAULOW. A rare case of bad hearing. *Norsk Magaz. f. Laeger*, vol. xi, No. 9, 1881.

38. Dr. KIRCHNER, Würzburg. An apparatus for aspirating and washing out exudations from the tympanic cavity. *Arch. f. O.*, vol. xviii, p. 158.

39. H. KNAPP. Trephining of mastoid in a case of chronic aural catarrh with intact drum-membrane. Opening of the lateral sinus. Healing by first intention. These ARCHIVES, vol. x, p. 365.

40. SCHWARTZE. A second series of 50 cases of surgical opening of the mastoid. (Continuation.) *Arch. f. O.*, xviii, pp. 163 and 273.

41. S. Moos, Heidelberg. Cholesteatoma of the mastoid with acute perforation into the external canal after the use of the Irish-Roman bath. Complete cure. *Zeitschr. f. Ohr.*, vol. xi, p. 233. (To appear in our next number.)

42. S. Moos, Heidelberg. Exfoliation of a necrosed bony (the upper ?) semicircular canal, preceded by vertigo and vomiting for a week. Cure with loss of what hearing was present before. *Ibid.*, vol. xi, p. 235. (This and the following communications to appear in our next number.)

43. S. Moos, Heidelberg. Further report on the above communication of necrotic exfoliation of a semicircular canal. *Ibid.*, vol. xi, p. 248.

44. S. Moos, Heidelberg. Œdema of the region of the temporal and zygomatic bones as a symptom of phlebitis and thrombosis of the lateral sinus. *Ibid.*, vol. xi, p. 242.

45. W. OLIVER MOORE, New York. Acute otitis media supervening on ot. med. pur. chronica. Necrosis of temporal, occipital,

[1] The *Revue mensuelle de laryngologie, d' otologie, et de rhinologie*, founded and published by Dr. E. J. Moure, Paris, Octave Doin, appears now in its third year. The few otological papers contained in the first two volumes are inferior to the laryngological, the majority of which are by Moure. As collaborators we find the names of Gruber, Lennox Brown, Miot, Sexton, Voltolini. The scientific importance of the journal approaches that of the *Annales des Maladies de l'oreille, etc.*

and parietal bones, with closure of lat. sinus, and abscess in cerebellum. These ARCH., vol. xi, p. 25.

46. G. S. MUNSON, Albany, N. Y. A case of chronic suppurative otitis, with exostosis of the external canal: brain abscess; death; autopsy. *Ibid.*, vol. xi, p. 29.

47. ALBERT BURCKHARDT-MERIAN, Basle. Supplement to Prof. Moos and Dr. Steinbrügge's case of hyperostosis and exostosis, etc. *Ibid.*, vol. xi, p. 106.

48. CLARENCE J. BLAKE, Boston. Aural polyp snare. *Am. Journ. of Otol.*, vol. iv, p. 23.

49. Dr. WEBER-LIEL, Berlin. Middle-ear affections. Reprint from Eulenburg's "Real-Encyclopædie."

50. CHAS. H. BURNETT, Phila. Injury of the auricle and of the mastoid, with facial paralysis. *Am. Journ. of Otol.*, vol. iv, p. 119.

51. S. POLLAK, St. Louis. Necrosis and elimination of almost the whole bony apparatus of the ear. These ARCHIVES, vol. x, p. 361.

52. J. D. RUSHMORE. A case of hemorrhage from the ear, probably due to a fracture of the skull. *Ibidem*, vol. x, p. 315.

53. S. Moos and H. STEINBRÜGGE, Heidelberg. On the formation of a neo-membrane in the drum-cavity as a result of pachymeningitis hæmorrhagica. *Ibid.*, vol. xi, p. 97.

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32. EITELBERG reports 92 cases of chronic suppuration of the ear from the clinic of Urbantschitsch, in six tables, and gives their causes, treatment, and average duration. Almost one half of them are under the head, "from unknown causes." 15% were from scarlet-fever, 11% from measles. Among the 11 after scarlet-fever, 6 could not be shown to have completely stopped running. None of 5 cases after variola was cured. Most of them were treated with iodoform powder; also boracic acid, alcohol, etc., were used. Pure iodoform powder is inferior to iodoform gelatine and iodoform collodium. Of 29 cases 11 were cured. The treatment had to be stopped in some cases on account of headache, sickness of the stomach, etc. In one case of a nervous young girl, short hallucinations were produced. The use of iodoform induces the formation of furuncles quite often. Boracic acid, which acts just as well as iodoform, is borne much better. Sometimes when one medication did not act well, the disease was speedily cured by another.

33. From the fact, that some patients who have perforations of the drum-membrane hear better when the ear is still full of water after syringing, MICHAEL tried the following: he dropped glycerine into the ear with a pipette, drop by drop, until the greatest distance of hearing was reached; he then put in a few drops of collodium while inclining the head to the opposite side. After ¼ of an hour the result was very gratifying. Before, the patient required to be spoken to loud in the ear, whereas after, he could hear a whisper at fifteen feet. At first the collodium remained only a half-hour; later it was required only every week. Instead of pure glycerine, alum or tannin can be mixed with it, which has a good effect on the otorrhœa. Michael thinks that many of these obstinate cases which resist other methods of treatment, can be cured in this way.

34. In the case of a patient with chronic otorrhœa, MOURE found a small tumor in the region of the posterior inferior wall of the tympanic cavity, which proved itself, on closer inspection, to be a pearl covered with mucous membrane. It was not removed, as a consequent inflammation was probable.

37. In the case of a 13-year-old boy who was considered a deaf-mute, THAULOW found that after a treatment of six weeks with the air drouche and sal ammoniac, he could hear a loud noise at one metre, and had learned to talk somewhat. On account of this experience he thinks that an examination of all the children in deaf-mute institutions should be obligatory. (Rev. by v. BREMER.)

38. KIRCHNER'S apparatus for the aspiration and washing out of the exudations in the drum-cavity differs from that of the reviewer in that it has a flexible tube, so that it can be given any desirable curvature; and besides this, the tube is fastened to a handle. As far as the first modification is concerned, the bend, close to a right angle, which is necessary, in order to throw the stream into the various parts of the tympanic cavity, is impracticable, since under such conditions the sides of the tube would approach too close together. In order to obviate this, the instrument-maker bent the tube after putting a lead rod into it, which was afterward melted out. If the tube is fastened to a handle, motions of the patient cannot fail to cause damage to the parts, while if the tube is connected with an India-rubber tube, it stays in position without being held, and follows the motions of the patient. If the tube is held by the hand of the patient himself, it will follow the motions of his body and do no damage.

40. SCHWARTZE reports the histories of nine new cases of opening of the mastoid. The first three cases and the last (Case 85) were widenings of fistulæ, and in two of these it seemed as if they would cause death in a short time, even during the operation. In one case death occurred in eight days, and in the other one day after the operation. In Case 85 death from meningitis occurred four weeks after the operation. In the fourth case an externally normal mastoid was opened with good result. In the remaining cases of caries necrotica of the mastoid, the opening was followed by good results.

49. WEBER-LIEL describes those cases of middle-ear affections (Eulenburg's "Real-Encyclopœdie," p. 47) which are not combined with perforation of the drum-membrane. The condition of the Eustachian tube plays the most important part in these conditions. According to him, the want of ventilation is brought about by collapse of the tube, since in the oft-repeated inflammations of the tube we have atrophy of the mucous membrane and loss of elasticity of the cartilage. In the most pronounced cases it results from the loss of power in the tubal muscles. He first treats of the chronic affections of the middle ear: as chronic catarrh, moist and dry; sclerosis of the mucous membrane of the drum-cavity. He considers a probing of the tube as indispensable to the diagnosis of the first condition. Reduction of secretion by the use of the tympanic catheter, by sucking it out, or by injection with the instrument described by him as koniantron, is very minutely gone into. Weber-Liel advances peculiar theories for the explanation of sclerosis of the mucous membrane of the tympanic cavity. He thinks that the diminution of hearing is not explained by the tissue-changes present, and that other causes must be at work, and that the sclerosis is but one result of a general process which involves the whole acoustic apparatus. Notwithstanding this opinion, he thinks that the origin of the process is to be found in an alteration of the muscular apparatus of the middle ear.

Weber-Liel thinks that he has found in most cases a weakness of the muscles of deglutition, and attaches great value to his observations of the intratubal application of the faradic and constant currents, which he considers as the crucial experiments in support of the correctness of his views. Subjective sensations of the patients, spasmodic contractions, and clicking noises were subjected to the electrical examination, and said to have disappeared

in the later stages of the process. Besides this, he alleges that a permanently increasing reaction of the tensor tympani muscle takes place. Corresponding to these views, the treatment consists chiefly in the electrization of the pharyngo-tubal muscles and the tenotomy of the tensor tympani. In conclusion, he discusses the acute and subacute affections of the middle ear, the traumatic and artificial, the idiopathic and symptomatic (in acute infectious diseases) inflammations, and the otitis intermittens.

NERVOUS APPARATUS.

(Translated by Dr. HENRY G. CORNWELL, Columbus, Ohio.)

54. BRUNNER, Zurich. A case of complete mono-lateral deafness after mumps; with critical remarks. These ARCHIVES, vol. xi, p. 102.

55. USPENSKY, Moscow. Deafness complicated with hysterical phenomena, and hysterical deafness. *Petersb. med. Wochenschr.*, No. 8, 1882.

56. WEISS, Vienna. A case of aphasia with word-deafness. *Wiener med. Wochenschr.*, No. 12, 1882.

57. HUGUÉNIN. Neuritis olfactoria. *Corr.-Bl. f. Schweizer Aerzte*, 1882, Nos. 9 and 10.

58. BROWNE. A case of insanity, with hallucinations of hearing, of seven years' standing, depending on disease of the middle ear. Royal Naval Hospital, Great Yarmouth. *Brit. Med. Journ.*, May 13, 1882.

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55. USPENSKY observed two cases, where, in one instance, as a result of severe diphtheria, the greater part of both drum-heads was destroyed, attended with discharge and total deafness. As a result of treatment the discharge ceased, and the treatment of the deafness went on favorably for a year. At times the hearing would become suddenly restored, and again abruptly return to its former condition. After the employment of the galvanic current five times, the hearing was permanently restored.

In the second case, the patient was wholly deaf, having perfectly normal drum-heads, but with complete anæsthesia of the auricle and external auditory canal. On using the constant current, no effect was obtained with 1, 2, 5, 8, or 10 cells; 12 cells, however, brought about the normal sensibility and complete restoration of hearing.

56. In the case described by WEISS of word-deafness, together with hemiplegia of right side, and aphasia, the clinical diagnosis of embolism of the *arteria fossæ Silvii sinistra* could be made, together with consecutive softening of the *island of Reil*, the first temporal convolution, and the nerve ganglia of the same side. The autopsy exhibited the fact that the aphasia and word-deafness depended on a lesion of the island of Reil and the first temporal convolution of the left side.

57. To HUGUÉNIN is due the credit of demonstrating the fact that in brain tumors the resulting *neuritis optica descendens* is due to a chronic inflammation of the sheath of the nerve. The same condition occurs in brain tumors, giving rise to anomalies in the sense of smell, due to a *neuritis olfactoria.* Huguénin describes a case of sarcoma of the right temporal lobe of the brain, with chronic inflammation of the *pia*, which extended from the location of the tumor over the entire base of the brain. The *chiasma* and *bulbi olfact.* were enclosed in new-formed tissue, and finally became atrophic. During life there was complete loss of sight (*neurit.-descend.*) and of smell, together with paralysis of the facial and hypoglossal of left side, caused by inflammatory œdema of the right *crus cerebri*, with atrophy of the right pyramid in progressive dementia. In a second case, only clinically observed, the crossed paralysis (left facial and hypoglossal and right extremities) was explained by the presence of a tumor at the lower border of the *pons* probably involving the *crus cerebelli ad pontem*, the patient having gyratic ataxia. The atrophy of the optic nerves, together with total blindness of both eyes, as well as complete loss of smell, was the result of a neuritis of the optic and olfactory nerves through an extension of basilar meningitis. *In an analogous manner, in both cases was the loss of hearing due to an inflammation of the auditory nerves.* The writer concludes that the disturbance of sight, hearing, and smell does not assist us in determining the location of a cerebral tumor. Almost all brain tumors cause a chronic inflammation at the base of the brain, which results in a neuritis descendens in the exposed nerves, where, according to its intensity, it brings about atrophy.

58. A sailor, aged 43 years, in 1874 took cold with congestion of the brain, giddiness, etc.; the result soon after, well-established insanity with hearing hallucinations of a roaring character. Seven years later an old middle ear catarrh was discovered, and after treatment the hallucinations and other brain symptoms completely disappeared.

NOSE AND NASO-PHARYNX.

(Translated by Dr. H. G. CORNWELL, Columbus, O.)

59. SCHEFF, Vienna. Rhinitis, coryza, acute catarrh. *Wiener med. Pr.*, No. 20.

60. FRÄNKEL, Berlin. On the use of iodoform on the mucous membranes. *Berliner med. Wochenschr.*, No. 17, 1882.

61. MOURE. Des pseudo-tumeurs des fosses nasales. *Revue mens. de laryngol., d' otol.*, etc., No. 1, 1882.

62. HACK, Freiburg. Reflex nervous affections and nasal diseases. *Berl. klin. W.*, No. 25, 1882.

63. BRESGEN. Bronchial asthma and its relation to chronic nasal catarrh, together with its local treatment. *Volkmann's Samml.*, No. 216.

64. JURASZ, Heidelberg. On the treatment of marked deflection of the nasal septum. *Berl. klin. W.*, No. 4, 1882.

65. SCHÄFFER, Bremen. Nasal polypi. *Deutsche med. Wochenschr.*, No. 23, 1882.

66. HARTMANN, Berlin. On the indications for the extraction of polypi. *Berl. klin. Wochenschr.*, No. 1, 1882.

67. LÖWENBERG. Des végétations adénoides dans la cavité naso-pharyngienne. *Extrait du journal de thérap.*, Paris, 1881.

68. BOSWORTH, New York. Adenoma at the vault of the pharynx. *Amer. Journ. Otol.*, Bd. iv, p. 37.

69. PURICELLI, Bamberg. A simple method of applying medicated fluids to the nasal mucous membrane and middle ear. *Berl. klin. Wochenschr.*, No. 8, 1882.

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59. After a long introduction on the normal anatomy of the nose, SCHEFF takes the ground that an individual disposition to cold does not exist, but that this condition is brought about by peculiarities in the structure of this organ. He then discusses fully the subjective, as well as the rhinoscopic appearances of this disease, and the various methods of treatment, and recommends in general an expectant course of treatment. For dryness and obstruction he uses a 2–3% sol. of salt or bicarb. of soda to snuff, and only when the discharge is thin and profuse he gives astringents; when the discharge is thick and purulent, a solution of carbolic acid (1–2%), or salicylic acid (5%), or chinolin (1.5%).

60. FRÄNKEL has employed idoform in diseases of the nasal passages, and particularly in the form of powder. The insuffla-

tion does not excite pain. It can be used with an addition of finely powdered boracic acid, or mixed with an equal part of tannin, or one part of tannin and two parts of iodoform, as a snuff. The salve can also be used (one part to ten) on the nasal mucous membrane or naso-pharynx, with a brush or cotton pellet. Poisoning from this small quantity is not to be feared. The iodoform is decomposed on the mucous membrane by the fatty substances, and the iodine constantly acting in *statu nascenti* is absorbed as iodide of albumen. A small quantity of it is, in many cases, discovered in the urine. It further acts as a strong antiseptic, encourages the formation of granulations, has local anæsthetic properties, and also is a specific for syphilis and tuberculosis. He has also obtained very favorable results from the iodoform treatment in atrophic catarrh of the nose and naso-pharynx.

In ozæna he uses first cotton tampons smeared with iodoform salve; later, iodoform powder; and obtained marked improvement in three cases out of nine. The scabs come away, the offensive smell disappears, and the mucous membrane is better nourished.

In rhinitis scrofulosa he used a salve of one part of iodoform, two of tannin, and ten of vaseline, with surprisingly favorable results. Within a few days the purulent discharge ceased and the excoriations of the upper lip entirely healed.

61. MOURE describes as pseudo-tumors the red hemorrhagic condition of the anterior end of the inferior turbinated bones, due to the presence of foreign bodies or the retention of pus. By the removal of the foreign bodies or the pus collections, the tumors disappear. Three cases are reported.

62. In consideration of the nervous connection between the nose and the organs of respiration, which is shown in the case of asthma from polypi, HACK came to the conclusion that hyperæmia, or a slight swelling of the mucous membrane, must more readily give rise to a direct irritation of the terminal nervous apparatuses, than when the latter are covered by hypertrophic connective-tissue layers and indolent tumors. He found that nasal diseases of trifling significance are frequently accompanied by marked neuroses, which disappear after the healing of the local affection, or even after the diminution of the excitability. A case of spasmodic sneezing and headache is reported, where, with but few symptoms, swelling and peculiar spotted injection of the mucous membrane over the middle turbinated bone were

observed. By the use of the galvano-cautery the spasmodic sneezing and headache quickly disappeared. The writer then suggests the question whether many cases of migraine may not have their origin reflected from the nose. In another case there was diffuse swelling of the nasal mucous membrane covering the under and middle turbinated bones, the cause of bronchial asthma and spasmodic sneezing. In a third case, a polyp the size of a pea on the right middle turbinated bone was the cause of an obstinate spasmodic cough, which was very marked on recurrence of the growth, and disappeared on its removal. A case of supra-orbital neuralgia, with scintillating scotoma, was occasioned by a small granulation on the middle turbinated bone. Hack holds that supra-orbital neuralgia dependent on nasal disease is purely reflex in character, and not through an affection of the frontal sinuses. Among the other cases of reflex nervous disturbances occurring in connection with diseases of the nose and naso-pharynx, a case is cited where, after cauterizing granulations in the naso-pharynx in an epileptic, the frequency of the convulsive attacks was much lessened. He believes that in such conditions a direct communication between the mucous membrane of the nasal passages and the subdural and subarachnoid spaces plays an important part.

63. BRESGEN gives in his article a very clear and convincing argument of the already suggested theory concerning the relation of bronchial asthma to nasal affections, and introduces therein many peculiar ideas.

In the treatment of asthma particular attention must be given to the removal of polypi. The faradic current, after the manner of Schäffer, in a reported case, had a very favorable influence on asthmatic attacks. In the other cases Bresgen observed the disappearance of asthmatic attacks with the cure of the nasal disease.

64. JURASZ calls attention to the results of lateral deviation of the nasal septum, and the various forms observed. They are seldom seen in the bony portion ; in the cartilaginous they are either single or double (S shaped), having either sharp angles, or round protrusions, and are either perpendicular, oblique, or parallel to the floor of the nose. Frequently a sharp or angular prominence is found where the fibrous and cartilaginous portions unite.

The method of Michel, viz., the removal of the irregularity by repeated pressure, Jurasz regards as valueless. This operation is

easily carried out in the anterior third of the nasal fossæ, but in the middle and posterior portions it is very difficult. The writer cites cases of Heylen, Demarguay, and Cassaignac.[1] A commonly employed method is that of Blandin-Rupprecht, where a section from the prominence is removed, but, according to Jurasz, this is only palliative in its effect. He regards the operation suggested by Adams as much more effective. By this method the irregular septum is brought into a desired position; and then a compressor, and later ivory plates, are applied. Jurasz completes this operation at one time, as in most instances before the application of the compressor the septum returns again to its former faulty position. He therefore united the forceps and compressor into one forceps-like instrument, each half of which is introduced separately. After their closure, he screws the under half off, so that only the compressor remains, which in three days is replaced by ivory plates, as mostly ulcerations from pressure and swelling of the mucous membrane appear. In conclusion, the writer reports two cases in which he operated according to his method and obtained good results.

65. SCHÄFFER arranged the cases of nasal polypi, operated by himself, in a table, under age, variety, location, and method of operation. The development of the growths was not considered. In general there were 102 mucous polypi and 8 other new formations operated on. Schäffer confirms the experience of Cloquet and the reviewer, that pedunculated polypi are at times found on the nasal septum. In a case of closure of one of the nasal passages, he bored through the septum with a galvano-cautery. Posterior rhinoscopy and digital examinations are indispensable in making a diagnosis. Pedunculated polypi can be more quickly, and perhaps more safely, torn out than cut off. After the removal of the polypi the point of their attachment was touched with the galvano-cautery. The telangiectatic tumors which are situated on the anterior end of the inferior turbinated bone, and which frequently give rise to profuse hemorrhage, can only be removed slowly with a wire snare at white heat.

66. HARTMANN adds another to the cases already reported by himself of nasal polypi growing in the upper pharynx, easily and safely torn out. A growth which filled the naso-pharynx was safely

[1] The reference of Jurasz to the operations of Heylen and Cassaignac, in a discouraging way, is not confirmed by my own experience. I have, in two cases of very marked irregularities in the septum, operated with the bone scissors, obtaining excellent results. HARTMANN.

torn away with angular forceps corresponding to those of Museux. The extraction of polypi can be accomplished (1) in cases of soft polypi, by means of a snare through the anterior nasal orifices, more especially when they are in great numbers, and where it is possible to remove them rapidly; (2) in cases of polypi situated in the naso-pharynx, through the mouth, by means of forceps. The extraction, is not, perhaps, successful in all cases, but it may be tried before the use of the snare.

67. Reviewing the paper of LÖWENBERG on adenoid growths, we call special attention to the statement, that he has frequently observed deformities of the thorax due to interference of respiration by obstructions in naso-pharynx. The affection includes the tonsils, and often simultaneously the lateral walls of the pharynx. The removal of the tumors must be undertaken as early as possible and the calibre of the nasal passages and Eustachian tubes restored. The swelling due to hyperplasia of the tonsils can be operated on in various ways; the swelling of the lateral walls of the pharynx, particularly about the orifices of the Eustachian tubes, must be removed by means of a small galvano-cautery, under the illumination of a rhinoscopic mirror.

68. BOSWORTH operated on the adenoid hypertrophy of the mucous membrane of the naso-pharynx with the best results by means of the snare, besides the galvano-cautery and the curette. See Dr. Burnett's report.

69. PURICELLI employs the nasal bath, pouring or syringing the fluid into the nose, while the patient, through phonation or inspection before a mirror, shuts the naso-pharynx off from the soft palate.

ABSTRACT OF AMERICAN OTOLOGICAL LITERATURE FROM NOVEMBER, 1881, TO JULY, 1882.*

By Dr. SWAN M. BURNETT, of Washington, D. C.

1. Causes of deafness among school-children and its influences on education, with remarks on the instruction of pupils with impaired hearing, and on aural hygiene in the schools. By Samuel Sexton. Circulars of Information of the Bureau of Education, No. 5, Washington Govt. Printing Office, 1881.

This paper contains, among other things, the results of an examination of 570 school-children, 261 of whom were colored. Among these 13% were found defective as to hearing in one or both ears. Such examinations if properly conducted and made sufficiently extensive would, we are sure, lead to some useful knowledge, and probably to the development of some facts with an important bearing on aural pathology and physiology. We are sorry that Dr. Sexton appears to have neglected this opportunity for examining the teeth of those children who did *not* have aural diseases. We can hardly expect the scientific world to accept as a fact that dental troubles produce so large a proportion of aural inflammations until we know how many persons affected with dental troubles are not thus affected. Such loose statements, delivered in an *ex cathedra* manner, are calculated to do injury to scientific otology, particularly when they are given such currency as usually befalls a governmental publication.

2. Practical deductions drawn from one thousand digital examinations of the pharyngeal orifices of the Eustachian tube, and Rosenmüller's fossa. By H. H. Wynne. *Bost. M. & S. Journ.*, Nov. 17, 1881.

* Continued from page 376, volume x, of these Archives.

The examination is made by passing the index finger of the right hand, in examination of the orifice of the right tube, up behind the soft palate to the orifice of the tube, which can be distinguished by a slight depression. The procedure is not painful, and the character of adenoid and other growths and the general condition of the mucous membrane are better made out by it than by an inspection with the rhinoscope.

3. On abscess of the brain in connection with disease of the ear. By G. S. RYERSON. *Canada Lancet*, Nov., 1881.

One case is related, that of a boy 8½ years of age, where the left ear was affected. *Post-mortem* examination showed the dura thickened and adherent to the calvarium. Brain congested, particularly on the left side; ventricles full of serum. Small collection of pus under the pia of superior lobes. Extensive caries of roof of tympanum and sulcus lateralis. Lateral sinus full of clots and pus.

4. On acidum boracicum and calendula officinalis and their uses in aural disease. By SAMUEL SEXTON. *N. Y. Med. Record*, Dec. 31, 1881.

The writer uses a mixture of equal parts of tinct. calendulæ and finely powdered boracic acid, made by evaporating the tinct. cal. down to a pasty consistency, mixing with the boracic acid, and then evaporating to dryness. It is then used as a powder poured or blown into the ear, for the various kinds of discharges, but particularly for chronic otorrhœas.

5. The treatment of diseases of the middle ear and contiguous parts by milder measures than those commonly in vogue. By SAMUEL SEXTON. *N. Y. Med. Record*, Jan. 31, 1882.

In this paper, which was read before the N. Y. Academy of Medicine, Dr. S. endeavors to show that the usual antiphlogistic treatment of acute aural affections—such as leeches, paracentesis of the *Mt*, and incision over the mastoid—is calculated in the majority of cases to do more harm than good. In their stead he recommends the internal administration of sulphide of calcium. So far as our knowledge extends, Dr. S. stands almost alone in his opinion, both as to the inefficiency of the treatment he condemns, and the value of that he recommends.

6. The nature of the human temporal bone. By E. COUES. *Amer. Jour. of Otol.*, Jan., 1882.

This is from a comparative anatomist's point of view, and has no special interest for the practitioner. It is simply a résumé of

Huxley's well-known studies on the subject, made public in 1869. The Greek word chronosteon is offered as a substitute for "temporal bone."

7. Comparative morphology of the ear (third article). By C. S. MINOT. *Amer. Jour. of Otol.*, Jan., 1882.

In the present paper M. considers, according to European sources: 1. The paired otocysts of worms; 2, the median otocysts of turbellaria and tunicata; 3, the auditory hairs of crustacea.

8. Adenoma at the vault of the pharynx. By F. H. BOSWORTH. *Amer. Jour. of Otol.*, Jan., 1882.

The explanation of the impaired hearing in enlarged tonsils and growths in the pharynx and nose, by supposing them to press on the orifice of the Eustachian tubes, is not tenable, because examination has shown that no such pressure exists. There must, then, be some other connection between the two conditions. B. explains it by a rarefied state of the air in the middle ear, caused by the obstruction of normal nasal breathing.

In mouth-breathing the current of air which in nasal breathing passes over the mouth of the tube, takes a new direction, and the mouth of the tube lying, as it were, in a hollow, the air immediately about it becomes rarefied, with, of course, a consequent rarefaction of the air in the drum cavity. The action of the pharyngeal muscles is also impeded, adding another factor for rarefaction. In the treatment of adenomas of the pharynx, he prefers Jarvis' snare when he can use it; if not, then the galvanocautery. Chemicals he does not recommend. Two cases are related.

9. Occlusion of the external auditory meatus. By SAML. SEXTON. *Amer. Jour. of Otol.*, Jan., 1882.

Case 1.—Occlusion of external auditory meatus from the closure of a wound in the ear, immuring a wad of cotton-wool. Successful operation.

Case 2.—Occlusion of the external auditory meatus of 54 years' standing from blow of a horse's hoof.

Case 3.—Occlusion of external auditory canal from adhesive inflammation during an acute otitis externa during infancy.

10. On the intermittent perception of sound as conveyed through the cranial bones. By J. A. ANDREWS. *N. Y. Med. Jour.*, Feb., 1882.

In this paper A. considers those cases, several of which he re-

lates in detail, in which, during an attack of middle-ear inflammation, the perception of sound through the bones, as tested by the tuning-fork, is lost, but returns again. He thinks this due to an increase, from some cause, of the intralabyrinthine pressure, which is in time relieved.

11. Scented iodoform powders for the ear. By CHAS. H. BURNETT. *Phila. Med. Times*, Feb. 11, 1882.

The odor of iodoform is so disagreeable, not to say offensive, to many persons, that it is highly advisable to conceal it if possible. For this purpose Dr. B. recommends a number of the essential oils, etc., to be used in combination with it. He has found particularly useful the formulæ, viz.: iodoform, 3 i, bals. Peruvian., gr. iii; and iodoform, gr. xx, tannin, gr. x.

12. Acute circumscribed inflammation of the meatus auditorius externus. By O. D. POMEROY. *N. Y. Med. Record*, Feb. 25, 1882.

A clinical lecture. In treatment P. discards the old plan of cutting down on the furuncle in the early stage. Incision should be made only after pus has formed. Other therapeutic measures consist in leeches, heat, and a building up of the general system.

13. The use of constitutional remedies in the treatment of ear-diseases. By SAMUEL THEOBALD. *Med. News*, Feb. 4, and 18, 1882.

This is a plea for the more frequent employment of internal medication in the various forms of aural inflammation—particularly of the use of mercury. T. has used this remedy—preferably in the form of the biniodide—with much satisfaction in all forms of middle-ear inflammation and in mastoid disease as well as in labyrinthine affections. In dry catarrh he has found it efficient in many cases. He has also used muriate of ammonia internally in mucous catarrh of the drum. He recommends pyrophosphate of soda in furuncles. He has found the administration of mercurial cathartics of great value in the treatment of aural inflammations.

14. Facial paralysis occurring in connection with aural disease. By SAMUEL SEXTON. *Ill. Quart. of M. and S.*, Jan., 1882.

Case 1.—Caused by necrosis of petrous bone.

Case 2.—Bilateral facial paralysis occurring in a case of sudden deafness from syphilis.

15. Significance of pain referred to the ear. By D. B. ST. JOHN ROOSA. *Med. News*, Feb. 11, 1882.

Dr. R. considers pain in reference: 1. To foreign bodies in the external meatus. He is of the opinion that impaction of cerumen with its consequences is due in most instances to an inflammation of the integument of the external meatus. 2. Furuncles and diffuse inflammation of the external meatus. In treatment he uses poultices behind and in front of the ear and in the meatus, dressing of the inflamed integument and the warm douche. He is sceptical as to the value of sulph. calcium in these cases. 3. Diseases of the middle ear, including the tympanic cavity, Eustachian tube, and mastoid process, for which he uses leeches, poultices, the warm douche, and incision over the mastoid, according to the parts involved. Typical otalgia rarely occurs.

16. Treatment of chronic suppuration of the middle ear. By W. W. SEELY. *Cin. Lancet and Clinic*, Feb. 18, 1882.

S. never syringes the ear but cleanses with a probe and cotton. He then uses the boracic acid after Bezold.

17. Treatment of chronic catarrhal inflammation of the middle ear by fluid injections. By A. B. KIBBE. *Rocky Mount. Med. Times*, March, 1882.

Where he has reason to suspect collections of hardened matter in the drum cavity, K. uses fluid injections. He prefers a solution of iodoform in chloroform, 5 grs. to ℥ j, and iodine dissolved in chloroform.

18. Acute inflammation of the middle ear. By E. E. HOLT. *Amer. Jour. of Otol.*, April, 1882.

In 1,000 cases of ear-disease, H. found 92 cases of acute and subacute catarrh of the middle ear. The detailed histories of 10 cases are given. The 92 cases are tabulated, giving the age, ear affected, health of the patient, duration of the disease, and the result. Of those suffering from acute suppurative inflammation, 4 died.

19. The value of counter-irritation in the treatment of certain affections of the middle ear. By A. H. BUCK. *Amer. Jour. of Otol.*, April, 1882.

B. has returned to the old practice of counter-irritation in some forms of aural inflammation. He has found it of especial service in those cases in which there remains a greater or less amount of engorgement after the disappearance of pain. In children he paints the mastoid with tr. iodine, while in adults he uses the fly-blister.

20. Comparative morphology of the ear (fourth article). By C. S. MINOT. *Amer. Jour. of Otol.*, April, 1882.

In this paper M. considers in detail (with illustrations) the tympanal organs of orthoptera, and allied structures in other insects.

21. Acute inflammation of the auricle (perichondritis). By L. TURNBULL. *Med. Bull.*, April, 1882.

T. reports four cases, three of which were the result of blows. All terminated with but little deformity of the auricle.

22. Injury of the auricle and mastoid portion, followed by facial paralysis. By CHARLES H. BURNETT. *Amer. Jour. of Otol.*, April, 1882.

A piece of bone ½ inch in length and breadth, and ⅜ in. thick, was removed from the external auditory canal, which was evidently composed of mastoid cells, and which, to all appearances, contained the facial canal. An O S examination revealed a choked disc on the right side (the opposite to the injured side).

23. Salicylate of chinoline in otorrhœa. By C. H. BURNETT. *Amer. Jour. of Otol.*, April, 1882.

B. has found this remedy quite as good as resorcin in the treatment of otorrhœa, and it possesses the advantage of being an amorphous powder, which allows of its being readily insufflated.

24. Aural polypus snare. By C. J. BLAKE. *Amer. Jour. of Otol.*, April, 1882.

Blake has modified his tubular snare in such a manner as to have one end of the wire fixed, the other being attached to the sliding ring. By this means a cutting action of the wire is obtained which enables it to sever tough, fibrous polypi much more easily.

25. Case of mastoid abscess which ruptured into the lateral sinus. Death from pyæmia. By D. W. PRENTISS. *Amer. Jour. Med. Sci.*, April, 1882.

The patient was a man, 31 years of age, who had suffered from chronic purulent inflammation of the middle ear. There was a chill, followed by fever and violent pain in the right ear and in the same side of the head, and the usual symptoms of pyæmia. He died on the thirtieth day of the disease. On autopsy a number of small abscesses (infarctions) were found in the lungs. There was a small abscess in the ant. lobe of the left hemisphere of the cerebrum; membranes and ventricles normal. Dura mater over the petrous portion of the right temporal bone darkly discolored; beneath, the bone was carious; and an abscess was discovered which communicated, by a free opening, with the lateral sinus, which latter was filled with pus and clotted blood.

26. Acute congestion of the upper portion of the tympanic cavity and membrana tympani. By C. J. BLAKE. *Amer. Jour. of Otol.*, April, 1882.

The subjective symptoms of this condition are severe paroxysmal pain, without any preceding sense of fulness, etc. There is but little tinnitus, and the hearing power is slightly, if at all, impaired. The objective signs are an intense congestion of the upper portion of the *Mt*, a serous exudation in this neighborhood, a bulging of Schrapnell's membrane, and a bulging of the *Mt* as a whole.

If the *Mt* is punctured at its lower part air passes out with a hissing sound, while paracentesis of Schrapnell's membrane is followed by a serous or sero-sanguinolent discharge. This is the first stage. The second stage soon sets in, in which there is general congestion of the *Mt*, with all the usual symptoms of acute inflammation. A paracentesis of the lower part of the *Mt* at this stage gives issue to a copious serous discharge. The fact that he has observed this condition most frequently in children during an attack of measles, and during the facial eruption, leads the author to infer that it is of reflex origin, being an innervation of the vasomotor tract controlling the vessels distributed to the anterior and superior portion of the drum, from the direct tympanic branch of the carotid. Puncture of Schrapnell's membrane gives more relief than any other procedure.

27. Aspergillus in the human ear. By D. N. RANKIN. *Pittsburgh Med. Jour.*, April, 1882.

Case 1.—Aspergillus nigricans in both auditory canals.

Case 2.—Aspergillus nigricans in R. auditory canal.

There was the history usual to such cases.

28. Reflex neurosis from irritation of the external auditory canal. By W. R. AMICK. *Cin. Med. News*, April, 1882.

The case is related of a woman who was troubled with hoarseness accompanied with an itching in the ear. On examination of the latter, some cerumen was found lying on the *Mt*. On removal, the hoarseness disappeared. There was a recurrence of the same symptoms afterward, which were likewise relieved by a removal of the wax.

29. Rational therapeutics in purulent otorrhœa or perforating suppuration of the middle ear. By S. POLLAK. *St. Louis Med. and Surg. Jour.*, May, 1882.

P. in cleansing the ear has not abandoned the syringe in favor of

swabbing with cotton. His local treatment thereafter is mainly antiseptic. He uses boracic acid in powder, but prefers the borate of soda as first recommended by Dr. C. A. Todd. He also looks upon alcohol as a valuable antiseptic. He urges an attention to constitutional measures, and finds mercury a valuable remedy.

30. Aural vertigo. By C. H. BURNETT. *Phila. Med. Times*, June 3, 1882.

In this paper, Dr. B. gives the structure of the auditory nerve according to the latest investigations, and describes the various forms of vertigo attending affections of the ear—dividing them into *middle-ear*, *internal-ear*, and *central-ear* vertigo. The general conclusions at which he arrives are: That there are sensory and motor fibres in the auditory nerve; that the former are connected on the one side by means of the inferior peduncles with the cerebellum, and on the other with the nerve filaments sent to the ampullæ of the semicircular canals. Any irritation of these ampullæ nerves may be carried from any one of the three divisions of the auditory apparatus or the auditory nerve in the form of mechanical pressure, which being conveyed to the cerebellum will cause vertigo. He looks upon *Ménière's disease* as only one form of aural vertigo.

31. The mechanical treatment of suppurative inflammations of the tympanum. By H. N. SPENCER. *Amer. Jour. of Otology*, July, 1882.

S. now uses the term *mechanical* as opposed to *medicinal*, since the treatment by insufflation of powders is now frequently designated by the term *dry*—a name which he gave to his method described in vol. ii, No. 3, of the *Amer. Jour. of Otology*, and to which paper this is a supplement. Further experience has convinced the author that the old treatment by syringing and drops is much less efficacious than the plan he now follows of cleansing the ear by means of absorbent cotton on a cotton-holder, and the insufflation of powders (either boracic acid or powdered borax), or his *compression* method by means of dry absorbent cotton applied directly to the affected tissues. The mechanical method is very useful in acute stages. The cotton pressed against the inflamed parts gives support to the vascular walls, diminishing exudation, and at the same time allows the discharge to have free exit. He thinks the air douche owes much of its beneficent action to the compression which it causes;—of course treatment of the pharynx and posterior

nares is not to be neglected, and general treatment is not to be overlooked where the constitution is run down.

32. Otalgia from reflex dental irritation. By D. B. DELAVAN. *Amer. Jour. of Otology*, July, 1882.

It was a case of pure otalgia, without evidence of inflammation, in the *right* ear. Diligent search failed to find any cause for the severe pain, until a dentist discovered that the second molar on the *left* side had lost its crown, while its roots were still in the jaw and covered by mucous membrane. These roots were extracted, and an abscess discovered. The otalgia then rapidly disappeared.

33. The growth of otology in the U. S., as represented by the number of patients treated in charitable institutions. By GORHAM BACON. *Amer. Jour. of Otol.*, July, 1882.

The N. Y. Eye Infirmary was established in 1820—the first one founded in America. In the 35th annual report 400 patients with diseases of the ear were treated. In 1864 the treatment of diseases of the eye and ear was separated. In 1871, 1,996 ear-patients were treated; in 1874, 2,439; in 1877, 2,679; in 1881, 2,818.

The Manhattan Eye and Ear Hospital was chartered May 5, 1869. Up to December, 1870, there were 420 ear-patients. The last annual report showed 838.

N. Y. Oph. and Aural Institute was incorporated in 1869. In the first annual report there were recorded 441 patients with ear-diseases; in the 8th report, 821; in the last report, 1,049.

The N. Y. Ear Dispensary was opened May 25, 1871. Up to July, 1873, 364 cases were recorded. During 1876, 503 cases were treated. The 7th annual report shows 874 new cases, while the last, for 1880, gives the number as 2,091, including the throat patients (we infer).

In the Brooklyn Eye and Ear Hospital there were treated up to April, 1869, when its first annual report was published, 380 patients with ear-diseases. In 1873, 664; in 1881, 1,093.

The Massachusetts Charitable Eye and Ear Infirmary was established in November, 1824. The two departments were separated in 1871. In the annual report for 1875, 2,085 ear-patients were recorded; in the last report, 2,922.

At the Out-patient Department of the Boston City Hospital, from April, 1878, to April, 1879, 327 ear-patients were cared for; in the last annual report 305 are recorded.

The Presbyterian Hospital of Philadelphia established a depart-

ment for the treatment of ear-diseases on Dec. 1, 1881. No statistics are given for the one month of its existence.

The Charity Eye and Ear Dispensary of Baltimore was founded seven years ago. For the year ending April 14, 1881, 87 patients were treated.

The Newark Charitable Eye and Ear Infirmary gives in its first annual report, up to December, 1880, 826 ear-patients; in its last report, 872.

The dispensary of the Albany Hospital for the year ending March, 1880, reports 228 new cases of ear-disease.

St. Peter's Hospital, Albany, reports from 1876 to 1880, inclusive, 266 ear-patients.

The Eye and Ear Department of Troy Hospital gives in its biennial report 107 new ear-cases.

The Buffalo Eye and Ear Infirmary, in its fifth annual report, for 1881, reports 51 new ear-patients.

The New Haven Dispensary reports, in its 19th report, for 1881, 19 ear-cases.

The Chicago Charitable Eye and Ear Infirmary was established in 1858, and for the first year treated 20 ear-patients. In the annual report for 1880, 444 cases are recorded.

This list, though far from complete, yet shows the progress of clinical otological work in this country. It is the author's purpose to make such a report each year, and asks that the reports of all institutions treating ear-diseases be sent to him.

34. Micro-photograph of a peculiar pear-shaped body found in the middle ear. By A. H. Buck. *Amer. Journ. of Otol.*, July, 1882.

The preparation was made in 1869, at Heidelberg, and microphotographed by Prof. J. W. S. Arnold, of N. Y. These pear-shaped bodies were discovered independently by Profs. Politzer and Kessel, and described in vols. v and vi of the *Archiv f. Ohrenheilkunde.* The plate is well executed.

35. Vascular tumor (aneurismal) of the deeper part of the external auditory canal. By C. A. Todd. *Amer. Journ. of Otol.*, July, 1882.

There were pain and swelling about the left ear of a man 45 years of age, with "throbbing" noise. Near the bottom of the auditory canal and hiding the *Mt* was a small swelling resembling a furuncle. An incision was made into this, which was followed by a profuse flow of semi-arterial blood, which necessitated tam-

poning. On removal of the cotton next day bleeding re-commenced. When the tampon was again removed three days later there was no hemorrhage, but the swelling was of its former size, and by pressing on it pulsation was perceptible. The throbbing noise was synchronous with the pulse. Pressure by means of a plug of cotton somewhat abated the noise. The case was submitted to no other treatment, and when last seen, nearly two years after, there was some improvement in the pulsatory noise, and the sac was whiter and flatter.

36. The glossograph. Automatic stenographic machine for the mechanical transcription of human speech. *Amer. Journ. of Otol.*, July, 1882.

In this article Dr. C. J. BLAKE gives an account of the ingenious apparatus of Amedeo Gentilli. The inventor has undertaken to analyze speech, not according to its sound, but according to the purely mechanical conditions in the mouth during its production, eliminating all those conditions which are not absolutely necessary for transcription.

He finds that all necessary sounds of speech can be reduced to: (1) *ch, r, g*; (2) *sch, l, s, t*; (3) *e, i, a, o, u*; (4) *f, b*; (5) *m, n*, and an aspiration sound, *h*.

Of these, group 1 is formed at the back of the tongue; 2, by the tip of the tongue; 3, by a narrowing and a corresponding lengthening of the whole mouth cavity; 4, by the lips; 5, by the nose. The inventor, however, for his purposes, must transfer these movements to one accessible vertical plane, and has chosen the median plane of the mouth. Thus transferred the sounds are produced as follows:

Lifting the back of the tongue, *c̄, ch, r, g, o, u*.

Lifting the tip of the tongue, *c̄, sch, l*.

Lifting the whole tongue, *c̄, e, i*.

Pushing the tip of the tongue forward, *s, t*.

Lifting lower lip, *o, u, f, b*.

Sinking under-lip, *a*.

Sinking upper-lip, *f, b*.

Expulsion of air through nose, *m, n*, with accompanying tongue and lip movements.

After a number of trials of various methods, the glossograph now consists of a number of light levers passing into the mouth and resting lightly in contact with the parts whose movements it is desired to record. These movements are communicated to a cor-

responding series of slide-bars set in the framework of the machine. These move pointed arms to which are attached pencils whose movements are at right angles to the movement of strips of paper on which the record is made. The expulsion of the air from the nose (in *m*, *n*) requires a rather complicated apparatus. There are six levers and pencils in all, drawing parallel lines on paper. The translation must be made from the curves made by the pencils.

37. Employment of calcium sulphide in the treatment of inflammatory and suppurative aural disease. By A. RUPP. *Amer. Journ. of Otol.*, July, 1882.

Six cases are given from the service of Dr. S. Sexton, in which the calcium sulphide was employed with benefit.

38. Diseases of the ear in children. By ANTON VON TRÖLTSCH translated by J. ORNE GREEN, M.D. New York: Wm. Wood & Co., 1882, pp. 165, price $1.50.

This is an admirable translation of the article on the ear diseases of childhood contributed by Prof. Troeltsch to Gerhardt's "Handbuch der Kinderkrankheiten" in 1879.

MISCELLANEOUS NOTES.

Increased facilities for the study of Otology are afforded by several newly-established post-graduate medical colleges, namely:

(1) The N. Y. POST-GRADUATE MEDICAL SCHOOL, D. B. St. John Roosa, Professor, and Edward T. Ely, Associate Professor, of Otology.

(2) The COLLEGE FOR MEDICAL PRACTITIONERS OF ST. LOUIS, MO., Thomas F. Rumbold, Professor of Diseases of the Nose, Throat, and Ear.

(3) POST-GRADUATE COURSE OF THE UNIVERSITY OF PENNSYLVANIA, George Strawbridge, Professor of Otology.